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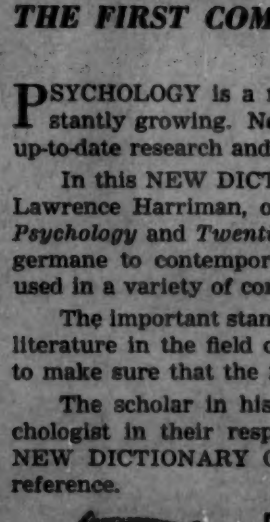

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THE AMERICAN JOURNAL OF PSYCHIATRY

ADDICTION: SOME THEORETICAL CONSIDERATIONS AS TO ITS NATURE, CAUSE, PREVENTION AND TREATMENT[1]

J. D. REICHARD
Medical Director USPHS, Lexington, Ky.

1. Introduction

Addiction is in itself an important phenomenon; an understanding of it also involves many of our concepts concerning human behavior and misbehavior in general. However, discussion and investigation of the problem are hampered by looseness in terminology, misuse of terms and confusion in concepts and hypotheses. It is the aim of this paper, first, to clarify the semantics of the subject and, second, to present hypotheses as to its characteristics. We must remember that a hypothesis is a guess, a tentative statement that events occur "as if" certain formulations were true. Hypotheses are not supported or disproved by argument and dialectic. When a datum is found that conflicts with a hypothesis, the hypothesis must be modified or perhaps discarded.

When necessary, specific references to details of published material will be made; the present discussion, however, is an attempt to go beyond present attitudes with the hope that this will facilitate the acquisition of more basic knowledge, not only of the problems of addiction but also of those of human behavior in general.

2. Definitions

Before we attempt to formulate a definition of addiction, it is necessary to discuss certain terms; these are sometimes used as synonymous with addiction, sometimes so misused as to obstruct a clear view of the nature of addiction.

Physical dependence and the *abstinence syndrome* are closely related phenomena, since the existence of the first can be determined at present only by the occurrence of the second. Physical dependence refers to the physiological change produced by prolonged dosage of certain drugs. This change is of such nature that when the drug is withdrawn suddenly, the appropriate abstinence syndrome appears.

Physical dependence and the abstinence syndrome are best known as produced by the opiates. Himmelsbach has studied these phenomena exhaustively. He and his coworkers have developed a point score by which the intensity and duration of the abstinence syndrome can be measured(1, 2). Batterman and Himmelsbach(3) have reported the existence of physical dependence and an abstinence syndrome associated with the prolonged administration of demerol. Kalinowsky(4) has reported them in association with the consumption of and withdrawal from barbiturates, alcohol and paraldehyde. No abstinence phenomena have been reported as results of prolonged use and abrupt withdrawal of cocaine or of marihuana.

The view, presented by some, that abstinence phenomena are solely expressions of fear, anxiety or panic over the threat of deprivation of the drug, is based on insufficient study and observation, probably in part on a confusion between what the addict asks for and what his physiological needs are. Experimental evidence for the "objectivity" of the opiate abstinence syndrome exists. Wikler has reported the occurrence of a morphine abstinence syndrome in chronic "spinal" dogs(5) and in decorticate dogs(6).

Emotional elements such as anxiety or fear may complicate the picture in narcotic addicts who have previously experienced the abstinence syndrome; such elements are variable and depend on the personality of the addict and on the setting and manner of withdrawal. The abstinence syndrome is stereotyped, the only variations being in its intensity.

The term *habit-formation* must be dis-

[1] Read at the 102nd annual meeting of The American Psychiatric Association, Chicago, Ill., May 27-30, 1946.

cussed, since so many persons use it as synonymous with the development of physical dependence. A habit is a type of activity that has been so well learned that the acts involved are carried out with little or no conscious attention. Habit-formation is the process of developing such types of activity. If used at all when discussing addiction, the term should be limited to the development in addicts of the habit of avoiding *all* discomfort or pain by taking refuge in some form of addiction. This habit, one of the serious complications of addiction, will be discussed later.

Cure perhaps should never be used in discussing addiction. Certainly its careless use as a synonym for the relief of physical dependence is incorrect and confusing. The relief of physical dependence is only a preliminary step in the treatment of addiction to opiates and to a few other substances. An assumption that this is a "cure" and that relapse by an addict when only relief of physical dependence has been accomplished indicates that treatment of addiction is hopeless, has led many persons into an unjustifiably pessimistic attitude toward the whole subject.

Even the use of the word "cure" as applied to the solution of an addict's problem in terms of total and permanent abstinence is questionable. When we apply this word to results in most diseases, we mean that the person who has been ill has recovered so completely that he is able to resume his usual activities. We definitely do not mean this when we refer to the "cure" of addiction. If we actually could "cure" a person addicted to alcohol who for years prior to addiction had been able to drink in moderation, we should expect him then to be able again to return to moderate drinking. Such results of treatment are so uncommon as to be almost non-existent; therefore, it is better to use other terms, *e.g.,* control, successful treatment, total and permanent abstinence, when referring to a successful solution of an addict's problem by total and permanent abstinence.

Euphoria has been used, usually in a derogatory sense, in discussions of addiction. The word means, quite simply, a feeling of well-being. It has been used, without qualification, to describe the feeling formerly considered characteristic of general paralysis; it has also been used, again without qualification, to describe the state for which an addict to opiates is assumed to be striving. The situation can be simplified by considering that there are two kinds of euphoria, true, based on good health, and false, attained by the temporary suppression of pain or discomfort(7). Use of the adjective identifying the kind of euphoria that is meant would prevent misunderstanding.

Addiction requires the consideration of a number of factors before a definition can be developed. Even when these factors are discussed and evaluated a definition must rest on the attitudes and possibly the beliefs of users of the term. There can be no objection to this; the prime necessity is for the user to tell us just what he means when he employs the word. The term "addiction" need not be confined to the use of substances. Persons who pursue certain practices to their own or the public's inconvenience, harm or peril are sometimes a greater problem than those who misuse a substance. It may well be that internal or external difficulties responsible for the unwise pursuit of a practice and those responsible for the misuse of a substance are similar. Studies of persons who have personal or social difficulties associated with the pursuit of a practice might throw light on this possibility. In this presentation, however, discussion will be limited to the misuse of substances.

Some of the factors to be considered in attempting to develop a definition of addiction are:

a. Self-control.

b. Harm or injury of any kind to the user, to his group, or to both.

c. Condemnation by society.

The use of the term "self-control" need not involve us in any metaphysical discussion as to free will. What is meant is the ability, not the "will-power," to follow or discontinue a type of behavior as a correct response to the situation in which an individual is placed.

How much of any one of these factors, and how many of them, must be considered in developing a definition cannot be stated categorically. Legally, the determination of the existence of addiction to a narcotic drug rests, first, on social condemnation as evi-

denced by the existence of statutes and, second, on the presence either of danger to society or loss of self-control with reference to one of the narcotic drugs.

In formulating a psychiatric definition, we might consider that the establishment of the existence of loss of self-control, and of harm to the user, or to his group, or to both, is an adequate basis for designating a person as an addict.

Uncertainty exists as to what substances may be regarded as addictive. The suggestion is offered that substances to which a significant number of persons first become addicted could be placed in this category, whereas drugs that are resorted to when the primarily addictive substance is not available, or in an attempt to correct physiological disturbance caused by the addictive drugs, would not belong in this category. Alcohol, opiates and the barbiturates are well-recognized addictive drugs. Benzedrine, until addiction to this drug by a considerable number of persons has been reported, is an example of the second category.

A physiological formulation might revolve around the question as to whether a substance tended to make a person less uncomfortable. When we are able to quantify tension satisfactorily, we may find that addictive drugs are those which either lessen tension or render the person less conscious of its effects.

Narcotic drugs are, by Federal statutes, opium and its derivatives, cocaine, hemp (usually called marihuana), peyote and demerol; only addiction to these substances is legally "narcotic drug addiction."

3. Etiology

Something more than introduction to the effects of a substance is necessary before addiction is established. Each year thousands are introduced to the effect of opiates and of alcohol without becoming addicts. Some difference may be assumed to exist between those who drink normally, or from time to time are given opiates without addiction, and those who become addicts.

At least three factors can be considered in erecting a hypothesis as to the personality of the potential addict and the reasons for the development of addiction. These are:

a. Degree of discomfort.

b. Ability to endure discomfort.

c. Strength, character, and orientation of internal controls of behavior.

a. Degree of Discomfort

Discomfort may be of any degree or kind from that of a toothache to a major depression. Dissatisfaction, frustration, unhappiness, tension, the discomfort resulting from "free-floating" anxiety—all these and many other conditions or situations that disturb equanimity or destroy true euphoria—must be considered.

An almost universal source of discomfort is tension. This may be defined as exaggeration of normal tonus to a point that produces discomfort. Irregular heart action, gastrointestinal symptoms, headache, restlessness, high or low blood pressure are a few of the accompaniments or expressions of this state.

A discussion as to whether an emotion causes or is the result of peripheral activities seems fruitless. He who maintains that the psyche is the important primary factor is faced with the necessity to define this in biological, non-metaphysical terms. He who thinks that the peripheral activity gives rise to the conscious elements of an emotion is faced with the equally difficult task of explaining the origin of the peripheral activity. The safest, most productive viewpoint seems to be that the entire cycle, cortical, mid-brain, vegetative nervous system, activity at the periphery and afferent stimuli resulting from it, constitutes the emotion; that study of any part as related to the whole may be productive, but that an attempt to "prove" that any part of the cycle *is* the emotion is fruitless. Further study and development and application of improved technics may show that the peripheral activity, and the sensations reaching the central nervous system as a result of this activity, are an essential part of an emotion; that as the level of this activity increases or decreases, the intensity of the emotion is intensified or ameliorated.

Whatever tentative viewpoint we may assume for purposes of more exact study, it seems certain that, for many persons, not the activity in the central nervous system, but its peripheral reverberations, are the elements of an emotional state that make the emotion unbearable. Anticipatory anxiety

alone may produce a well-planned approach to tomorrow's problem. If it is associated with severe "nervous indigestion" or with migraine, for example, proper planning and carrying out of plans may be totally disrupted.

Some degree of tension and its accompanying discomfort are probably necessary for many persons as a goad to socially valuable activity. It seems equally probable that for others the result of this goad is socially inacceptable, even dangerous, behavior.

b. Ability to Endure Discomfort

As is well known, the degree of ability to endure discomfort varies with ethnic groups, with the setting in which the discomfort is encountered, with the basic personality of the individual, and with the state of his health at any particular time. The interplay between this varying ability and variations in the level of discomfort probably forms the background for much human behavior and misbehavior. Another activity, or factor, must be considered before we can complete our formulation of the personality of the potential addict. That is:

c. Strength, Character and Orientation of Internal Controls of Behavior

It may be that ability to endure discomfort is a product or result of the internal controls of behavior. Both seem to result from training, either intentional or accidental. However, since they cover somewhat different aspects of behavior, they will be considered as manifestations of different processes.

An approach to an understanding of human behavior, especially when the organism is subjected to external or internal stress, requires that we assume that internal controls are of several kinds, each varying in strength and orientation. The type of control called conscience, or censor, or superego, works as though the individual when confronted by a choice of reactions, immediately and automatically selects the response that he has been trained to consider correct. Another type known as ego control seems to function as though the individual said to himself, "I won't do that because—" punishment, social disapproval, danger to his life or welfare, etc., might result. The behavior of others seems to indicate that neither of these controls is present in detectable amounts. Behavior is regulated almost entirely by the presence of external authority.

Variations in social attitudes toward specific behavior patterns introduce an element (viz., orientation of controls) important in understanding certain types of archaic or anti-social behavior. Studies of behavior among children trained under Nazi control in Germany might disclose many with an automatic type of reaction, but the resulting behavior would be considered as highly undesirable. Making illicit whiskey is condemned legally; however, in certain isolated regions, this attitude never has been accepted by the community. In such a locality we might find a well-integrated, automatic control, archaic as related to the country as a whole, but of the same character and strength that would result elsewhere in socially acceptable behavior.

Reactions of persons with different types and degrees of control to certain substances are interesting. They throw light both on the character of the individual's controls and on the action of the substance. For example, persons with normally adequate ego control sometimes behave badly when overdosed with alcohol. They behave as though the part of the nervous system ordinarily dependable in calculating the effect of behavior had ceased functioning temporarily. The same person under adequate opiate dosage may remain quiet and well-behaved. This difference may be understood by the assumption that alcohol acts on some activity of the cortex, the lower levels being unaffected, while opiates act primarily on the lower levels of the brain to decrease the strength of primitive aggressive drives. The behavior of the person who "carries his liquor like a gentleman" no matter how intoxicated he may be can be viewed as the result of a control so automatic and ingrained that it remains active even when mental processes are profoundly affected.

The behavior of the person who conforms to the *mores* of his group only when under direct and efficient supervision resembles that of the immature child, in whom no controls of any kind have been developed. British writers discussing this type of be-

havior in adults use the term "moral imbecility." It can be thought of as analogous in the emotional sphere to imbecility in terms of intelligence.

The behavior of some persons indicates that the automatic control, the censor or super-ego, is hyperactive; failure to live up to perhaps impossibly high standards causes great discomfort and unhappiness. When the results of this situation are added to discomfort associated with other difficulties, and the individual's behavior deviates from what he regards as correct, serious disorders may result. When such a person resorts to addiction, he faces not only harm to himself or to his group; his own super-ego may be so troublesome that his addiction may become much exaggerated. A familiar example is that of the person who starts drinking early in the morning so that he may dull the recollection of his misbehavior of the previous evening.

When we consider the result of the interplay of these three factors in the production or prevention of addiction, the situation is simplified, and various approaches for study can be visualized. A high degree of discomfort with ability to endure it and with a control adequate to the situation may result in a successful career. The person may be unhappy, perhaps hard to get along with, but may accomplish a great deal. Whether this accomplishment is socially acceptable and valuable will depend upon the orientation of his controls. If the level of discomfort is too high for the ability to endure and controls are adequate and correctly oriented, we may have the chronic invalid, the valetudinarian, haunting doctors' offices, a follower of various cults, with a medicine cabinet filled with "remedies," ethical or otherwise, perhaps vulnerable to any widely publicized cure-all, but not addicted to the use of any substance disapproved by his standards. When controls are inadequate, misdirected or non-existent, and if the person is introduced to the use of an addictive drug, addiction may develop.

Just as it seems that any personality has its breaking point if internal and external stresses become too severe, so it is probable that anyone can become addicted if discomfort becomes intolerable. The addict whose internal control is automatic but inadequate to the situation, can discard his addiction and work out a better compromise with the situation, if, before the complications of addiction have developed, the amount of discomfort is reduced to a level that he can endure.

4. Complications

After addiction has been established and has continued for some time, important changes occur which may greatly alter and complicate the problem of treatment. The most spectacular, but most easily relieved, is that of physical dependence on the use of certain substances, *e.g.*, opiates or alcohol. Serious, sometimes irreversible, changes occur as a complication of addiction to alcohol. These are usually secondary, *e.g.*, avitaminoses or trauma to the addict, particularly to his nervous system. Another more subtle change may be described under the term "regression." A recent book portraying the behavior of a man determined to obtain whiskey in spite of the efforts of his friends and relatives, gives an excellent picture of a part of this type of complication. When the use of a substance is forbidden entirely, as with marihuana, or limited to medicinal use only, as with the opiates, the situation is complicated by generally unsuccessful attempts to avoid apprehension, the necessity to associate with the underworld in order to obtain the substance, periods spent in jails and penitentiaries where close association with professional criminals is unavoidable. It would be difficult for a normal personality to undergo such experiences without harm; for the type of personality that seems to be the background for addiction, they may cause irreversible distortions.

Probably the most serious, the most insidious, the most important complication of addiction is the development of the habit of avoiding not only the particular discomfort that may have precipitated addiction, but discomfort, unhappiness, anxiety, in fact, any deviation from true euphoria, by the use of some addictive drug. Closely associated with this reaction, perhaps a part of it or a result of it, is reduction in or elimination of drive. An organism that is entirely comfortable does nothing. This is just as true of a man as it is of an amœba. The addict

who is "high," that is, experiencing a state of false euphoria, will be valueless to himself and to his group. The time and effort spent in trying to attain and maintain this state will dissipate or misuse what drive he may have.

Another complication, perhaps a result of one or more of the complications already mentioned, is the practice seen among addicts of using large amounts of substances dissimilar in action from that of their drug or drugs of addiction. This may be an example of compulsive action; more probably it originates from a desire on the part of the addict to produce any change, no matter what, in his physiology.

5. Prevention

The prevention of addiction depends on detection and treatment of the preaddict personality before complications make the problem more difficult. The simplest approach to prevention is reduction in the amount of discomfort. Only a few sources of discomfort will be discussed; any student of human behavior will be able to mention many others.

A much neglected source of discomfort is an attempt to engage in an occupation for which a person is unsuited. Most people drift into, or are forced into, vocations without any attempt to determine their fitness for them. When the person's intelligence is inadequate for the vocation, when he is lacking in other necessary qualities, especially when the vocation does not give sufficient scope for his assets, discomfort, unhappiness and tension frequently occur. An additional difficulty develops because a person may be able to endure these until he reaches the period of presenescence. When severe maladjustments occur, even though we may find that the person would have been better adjusted, perhaps more useful, in another occupation, he will be too old or too rigid to change.

Information obtained from tests of intelligence, aptitudes and other aspects of the personality, if available for student counseling at least as early as the high school period, would prevent some of these tragedies. In certain situations, intensive psychotherapy for the individual or for his parents might be necessary to enable him to follow a vocation for which he is suited instead of one with high prestige value but requiring abilities that he lacks. With this there should be methods of financing higher education for those with great capabilities but without the means to develop them.

Abnormal emotional states are a source of much discomfort. Some of them are difficult to treat, for example, compulsive states and chronic anxiety conditions. Depressions, however, frequently yield to some type of shock treatment. A difficulty is that reactive depressions frequently are masked by apparent cheerfulness or even jocularity. Workers with the Rorschach test sometimes are astonished to find, in persons whom they thought they knew well, large depressive elements. It seems probable that a significant number of persons become addicted to alcohol in an attempt to cope with depression. Here we could accomplish much in preventing addiction if such persons could be treated before addiction is established.

Another field for prevention is that of painful conditions which may be eliminated. Examples are: ruptured nucleus pulposus, and scalenus anticus syndromes. The latter frequently is overlooked, especially when generalized pain in the arm, not following peripheral nerve distribution, is the only symptom.

Relief from discomfort related to tension is sometimes simple. Recognition of its existence and intensity seems to lag behind our ability to handle it. If tension-related discomfort is recognized early, before a vicious cycle between the central nervous system and other parts of the body has been established, such simple methods as physical exercise will give relief. Training in conscious relaxation has been advocated(8). Change to a more suitable vocation, or when that is not possible, development of an interesting avocation, may provide a simple solution. For some, of course, all we can suggest is an effort to increase the patient's ability to endure discomfort. Even then a search for some remediable condition should be unremitting. Energy is needed for personality integration; when this is barely adequate, the extra load of an abscessed tooth or of some other toxic or painful condition may be sufficient to precipitate a serious personality

disorganization; removal of the apparently minor difficulty may prevent a catastrophe.

The pharmacological approach to discomfort must be cautious. Especially is this true in the use of opiates in the treatment of chronic conditions. If the condition is remediable, *e.g.*, a diseased gall bladder, and the patient refuses operation, the well-advised physician will withdraw from the situation. Even when a chronic painful condition cannot be relieved, the use of opiates should be avoided, or rigidly restricted in amount. The difficulty, especially if the patient has a "preaddict" personality (*i.e.*, is a potential addict) is that he will not be satisfied with analgesic dosage, but will demand, and probably obtain by one means or another, much larger amounts in an attempt to attain and maintain a false euphoria.

A pharmacological approach to the relief of tension and its attendant discomforts is also dangerous. If one could be certain that the patient would not exceed the minimal necessary dosage, the use of such drugs as the barbiturates might be justified. Here the use of a projective technic such as the Rorschach might be helpful. If this showed the existence of an adequate and well-oriented super-ego, one might feel safer in using pharmacological methods than if controls were inadequate or wrongly directed.

What can be done in the adult to increase ability to endure discomfort is uncertain. Improvement in general health will help. Psychotherapy, perhaps concentrating on the attitude of the patient toward the apparent cause of the discomfort, may be helpful. Persons fortunate enough in childhood to have been trained to attitudes of stoicism usually face the discomforts of adult life satisfactorily, and may be less liable to become addicted because of discomfort. As with many other personality difficulties, prevention should begin in childhood.

We are also uncertain as to what can be done with adults in modification or alteration in the character, amount and orientation of internal controls of behavior. In fact, very little is known about how these controls are developed, what is responsible for their failure to develop, or for the development of an over-active super-ego.

One phase of education and its effect on behavior controls deserves attention, namely, the character of education in physiology encountered by young people. Many statements in school textbooks are grossly incorrect; others so distorted as to give entirely erroneous information concerning such matters as the action of tobacco and alcohol. After early control of behavior has been built upon such incorrect formulations, it is probable that when the falsity of school-acquired theories later is discovered, controls as to the misuse of such substances will be impaired seriously. It is even possible that attitudes toward matters correctly taught may be changed for the worse upon the disillusioning discovery of incorrectness and exaggeration in the teaching of other subjects.

When internal controls are inadequate or misdirected, it is necessary to institute external ones. An ideal situation would be that deviation from acceptable behavior would be followed immediately and inevitably by an unpleasant experience. Such a set-up is impossible outside the laboratory. Fortunately, for many persons even an approximation of the ideal situation described is adequate to supplement inadequate internal controls. It is possible that energy expanded in developing such an approximation to this situation would give better and more dependable returns than the same amount of energy devoted to therapeutic interviews.

6. Treatment

The treatment of addiction requires the following essentials: control of the addict for a considerable period; relief of physical dependence, when this is a complication of the use of the drug or substances involved; removal, when possible, of sources of discomfort; increasing the ability of the addict to endure discomfort; improving, when possible, the internal controls of behavior; supplementing them, for a long period, with some type of supervision; correction of the complications of addiction, avitaminoses, regressive reactions, anti-social attitudes, and —most difficult of all—correction of the habit of taking some substance whenever the addict is uncomfortable or unhappy.

Control of the addict for a period of at least one year is imperative. Sometimes the period of control must be longer; for a few,

such control must be life-long. "Control" does not mean confinement in an institution. That is usually necessary for some months at the beginning of treatment. Supervision in the community, with the ability on the part of someone with the proper training to return the patient to an institution for further intensive treatment when necessary, is a type of control that is greatly needed.

The development of legal methods of restricting the personal liberty of the addict, analogous to those now functioning for psychotic persons, with utilization of them by communities, is highly desirable. Since most definitions of addiction include loss of self-control, it seems unrealistic to expect an addict to exhibit enough control to remain voluntarily in a drug-free environment.

At present, the only sure way to secure treatment and prolonged supervision after intensive treatment is to have the addict convicted of a felony in a Federal court. For many persons this is a rather drastic procedure. We should, by obtaining the cooperation of our colleagues in the legal profession and of our legislators, endeavor to work out a kinder but at the same time adequate method of control.

Such methods, even when developed, will not provide a complete solution. We must then encourage not merely among specialists but in the medical profession generally an interest in the treatment of addicts; we need institutions or units in institutions adequate for intensive treatment, and we must develop methods of proper supervision in the community after the period of intensive treatment.

Relief of physical dependence, once control of the patient is secured, is relatively simple. It is based on rapidly reducing dosage of the drug, *e.g.*, morphine, or of a pharmacological substitute for it, *e.g.*, barbiturates for alcohol or paraldehyde. General supportive measures, administration of large doses of vitamines and of adequate fluids and minerals, etc., are indicated whether or not the drug of addiction is one that produces physical dependence.

Many "cures" of opiate addiction, that is, allegedly easy, painless methods of relieving physical dependence, have been advocated. Some are harmless, some are dangerous. Any of them so far examined that do not employ opiates may result in a fatality if marked physical dependence is present. It is strange that our profession finds it so difficult to accept the simple fact that the best basic treatment for the opiate abstinence syndrome is morphine in rapidly decreasing amounts. The physician who is entirely willing to grant that an addict to alcohol needs a "pick-up" to help him through the early stages of abstinence seems loath to admit that the addict to an opiate may need analogous treatment, not only for his comfort, but even to save his life.

The problems of discomfort and the strengthening of stoicism and of controls of behavior resemble those discussed in the section on prevention. After addiction has been established, the problem of making the unpleasant results of relapse to addiction immediate and inevitable is even more important than in prevention.

The best approach to the problems of regression and habit-formation is to secure, in fact, to enforce, early treatment of addiction. What of permanent value can be done after these are well established is uncertain.

Preliminary statistical surveys suggest that persons tend to recover spontaneously from addiction in their late forties or early fifties. Similar trends have been discussed in criminology. In evaluating methods of treatment, we must consider whether results are due entirely to treatment, or wholly or in part to aging.

An important part of the treatment of addiction is the preparation of the community to accept the addict after intensive treatment has been completed. This has been especially true for the addict to opiates. The myth of the "dope fiend" has been established so firmly that it is at times difficult to obtain for the addict an opportunity either to prove to society that he has regained the power of self-control, or to learn for himself that he has not. Communities which at least tolerate, if they do not actually condone, the aggressive dangerous activity of the addict to alcohol, are greatly upset by the presence in their midst of an addict to opiates, whose offense may consist merely in trying to obtain narcotics on a forged prescription. Patients who are given decent opportunities and who nevertheless fail should, of course, be given further intensive treat-

ment. They usually return to an institution in a relatively cooperative mood, but if no opportunity has been given to attain a self-respecting position in the community, the addict who relapses generally feels, and correctly so, that he has not been given a proper opportunity to rehabilitate himself.

The rôle of psychotherapy in the treatment of addiction warrants some discussion. The opinion is held by many that it is the most important approach to this as to other personality disorders. That is probably an oversimplification. The hypothesis that "psychic" disorders will be cured if the patient talks long enough to someone or if someone talks to him long enough and says the right things, is not easily tested. Certainly, many difficulties seem to be helped by superficial psychotherapy; nevertheless, we are confronted always by the possibility that the patient might have solved his difficulty unassisted, or that the improvement may be due to some other unrecognized alteration in his internal or external environment.

Prolonged psychotherapy may be of help for severe personality disorders associated with addiction. Practically, however, we are confronted by the hard fact that there are not enough persons suited by personality and training to care for all those who, we assume, could be benefited by this technic. Let us hope that there will be developed more short cuts to improvement in personality disorders as efficient as shock therapy, and founded on a more solid knowledge of what the basis for the disturbance really is, and what we are doing for it.

7. General

Basic in the whole attack upon addiction, in fact, upon all other personality disorders, is a better understanding of normal neurophysiology. No one as yet has demonstrated to the satisfaction of scientists the existence of psychological processes in the absence of a functioning nervous system. It is possible that the dualistic attitude which is almost automatic with us, the personalization of mental processes under the term of "the" psyche, the inability or the failure at least to tolerate a monistic approach to the problem, all these have retarded a better understanding of the problems of behavior and of misbehavior. When we can understand the normal at the level of anatomy, chemistry, physics and physiology, we may open up the possibility of control by relatively simple procedures.

An example familiar to all is the simplification of the control of diabetes by the development and use of insulin. Before its use great self-control had to be exercised by the diabetic, controlling and enduring the discomfort associated with his abnormal sugar metabolism. That situation now has been simplified greatly.

A faint premonition of a pharmacological approach to the control of behavior is the sometimes successful and spectacular improvement of mood following the use of amphetamine. When we understand how this substance in some instances changes "abnormal" to "normal" feeling tone, we may be able to develop more dependable methods. This, of course, is "substitutive" therapy, and sometimes is opposed rather strongly in the treatment of personality disorders. The objectors, if they are consistent, must condemn also the use of thyroid extract for myxedema, insulin for diabetes, and probably the use of sedative drugs in the control of epilepsy.

A seemingly narrow, but perhaps important field for study has been suggested by Robinson (9), namely, an attempt to discover what is the nature of the change that converts a normal user of alcohol to an addict. Such knowledge might enable us to prevent it, or perhaps to reverse the process. For many persons, this might solve the problem of abnormal drinking.

A mathematical approach to the problems of the relationship between psychological and neurological activity has been suggested (10-13). An approach which has been so rich in results in basic problems in physics, chemistry and biology certainly should not be neglected.

As the late Dr. Sachs suggested years ago, we need on our research teams experts in the basic sciences, not as technicians or ancillaries, but as full partners, sometimes as leaders. Fresh viewpoints, imagination in erecting hypotheses, ingenuity in testing them, complete liberation from archaic dual-

istic thinking about the problems of human biology, may prove as productive in exploring the cause and treatment of addiction and other forms of human maladjustment as they have in other fields.

Most narcotic addicts, when asked why they relapse to the use of their drug, reply, "Because it makes me feel normal." When we can acquire a body of knowledge that will enable us to do properly for the addict and preaddict what they are trying to do improperly, we may have solved not only the problem of addiction but many other riddles of human biology.

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THE USE OF AMINOPHYLLINE IN NEUROPSYCHIATRIC DISORDERS ASSOCIATED WITH CEREBRAL ARTERIOSCLEROSIS AND HYPERTENSIVE ENCEPHALOPATHY

HANS H. REESE, M. D., AND FRITZ KANT, M. D.[1]

Madison, Wis.

The admission of patients with cerebral arteriosclerosis or with hypertensive encephalopathy to a psychiatric hospital is necessitated in a number of cases by an acute confusional state. The accompanying restlessness and often the extreme agitation makes the patients unmanageable at home. Fluctuation in the degree of clouding of consciousness is characteristic for the psychotic episodes due to cerebral arteriosclerosis. Some of these patients are clear and rational most of the day but tend to become confused towards evening and at night during which insomnia persists. These episodes may recur or continue unabated over periods of years. It has been generally assumed that the pathogenetic factor is inadequate and unequal blood supply to the brain. Similar episodes occur also with hypertensive encephalopathy; however, the duration is here commonly limited to shorter periods. Psychotic phases associated with hypertensive disease are present frequently in the initial phases of the vascular disease at a time when the blood pressure is still relatively labile. Little attention has been given in the text books of psychiatry to these aspects of cerebral arteriosclerosis and hypertensive disorders, nor are specific recommendations for their medical care and handling to be found. For the practitioner, as well as for the psychiatrist, such cases are difficult therapeutic problems. The usual attempts at sedation with barbiturates not only fail but aggravate the confusion and promote additionally hallucinatory experiences. The same holds true for opiates and scopolamine. Frequently, therefore, refuge is taken in the undesirable methods of physical restraint.

In addition to delirious confusion and agitation, insomnia, dizziness and headache are obstinate symptoms which are difficult to cope with.

For a number of years we have administered to these patients aminophylline in dosages from 1½ grains t. i. d. to 3 grains q. i. d. assuming that the drug improves cerebral circulation by vasodilatation. It is accepted that aminophylline has a vasodilating effect on the peripheral vessels including the coronary. It increases cardiac output and lowers venous and intrathecal pressures, but the effect on the cerebral vessels is still a moot question. Our investigation was one of clinical observation only.

For the evaluation of the aminophylline effect we first reviewed the charts of all the male patients treated with this drug during the years 1944 and 1945. It appeared necessary to eliminate those cases in which the medication was given for only a few days or less. Also those cases were excluded which had received in addition KCNS because of hypertension, alkaloids because of extrapyramidal symptoms or testosterones. There remained 32 cases and of these 23 cases derived definite benefits from the medication. The table gives a short profile of the improved cases. It specifies the symptoms that improved or disappeared. Among these cases were 6 confusional states, all of which showed good improvement. On the other hand, retention and other memory defects were least amenable to change. Of the total 32 patients none died in the hospital; 27 were discharged to their homes and 5 were transferred to institutions.

We conclude that aminophylline has a place in psychiatric therapy and is to be recommended for the treatment of acute phases in psychoses with cerebral arteriosclerosis and hypertension. It is far more effective in sedating these patients than the barbiturate group. The latter frequently increase the confusion. With doses of aminophylline ranging from grains 1½ to 3 grains q. i. d., confusional states cleared up often very rapidly. Vertigo and various forms of dizziness, headache, insomnia as well as neurological manifestations were greatly benefited in a number of cases.

[1] From the Neuropsychiatric Department of the University of Wisconsin Medical School.

Name	Age	Diagnosis	Findings	Response
M.M.	57	Meniere's syndrome on vascular basis, hypertensive encephalopathy.	Spells of vertigo once a week, unsteady gait, headache.	Improvement.
A.M.	64	Cerebral arteriosclerosis with confusional state.	Confusion, disorientation, severe agitation, retention defect, memory for recent events poor. B.P. 122/66.	Confusion and agitation disappeared quickly, retention improved. General mental weakness remained.
A.J.E.	59	Meniere syndrome on vascular basis.	Dizziness of vertigo type comes in spells, depressed because he could not work. Labile B.P. 165/90-107/70.	Vertigo disappeared.
J.J.S.	57	Hypertensive encephalopathy, generalized arteriosclerosis.	Fainting spells, dizziness, insomnia. B.P. 150/90.	Especially insomnia improved, dizziness better.
M.B.	68	Hypertensive encephalopathy, left hemiplegia, stroke 2 weeks before admission.	Left hemiplegia, memory impaired.	Improvement in every respect.
A.K.	75	Cerebral arteriosclerosis, spastic paraplegia, headache 2 years; spastic legs 8 years.	Headache, severe spastic gait, "electric shocks all over body." B.P. 150/80.	Headaches gradually improved, felt much better.
H.E.P.	74	Cerebral arteriosclerosis with confusional state following amputation of left leg below knee; confusion 2 weeks. Memory impairment 4 years. Had morphine and barbiturates.	Confused, disoriented; sleeping restless, delirious, pupils miotic; memory impaired. B.P. 140/70.	Acute symptoms disappeared.
J.S.	56	Cerebral arteriosclerosis with hallucinosis and depression, confusion and aphasia for 2½ weeks.	Depressed, retarded, hallucinations at night, people talking about him; confused at times, mild aphasia, agrammatism.	Good improvement, gained 16½ pounds. Stayed on medication, further improvement on re-examination 6/20/44.
O.F.S.	69	Cerebral arteriosclerosis, left sided hemiplegia, 2 weeks.	Left hemiplegia, left leg progressively weaker. B.P. 126/78.	Hemiplegia improved.
G.R.S.	78	Confusional state, arteriosclerosis and hypertension.	Confusion, aphasia, impairment of memory. B.P. 230/120 to 175/100.	Good improvement in six days.
L.E.	43	Hypertensive encephalopathy with depression and arteriosclerosis of brain.	Hemiplegia, depression. B.P. 134/100.	Good improvement.
D.H.	52	Arteriosclerotic encephalopathy, thrombosis of branches of left middle cerebral artery.	Visual disturbances, mental retardation, numbness right arm and leg, retention impaired. B.P. 134/84.	Improved a great deal, able to do light work on farm.
L.L.S.	60	Hypertensive encephalopathy; generalized arteriosclerosis.	Spells of dizziness, unsteady gait, headache, pain in legs.	No more dizzy spells, gait better.
L.D.	54	Hypertensive and arteriosclerotic encephalopathy right hemiparesis and cerebral atrophy especially left parietal lobe.	Pain and weakness of arms and legs, headaches, dizzy spells, difficulty walking especially in dark. B.P. 180/95.	Pain and dizziness disappeared. Neurological findings unchanged.
G.W.O.	62	Encephalomalacia and arteriosclerosis.	Pseudobulbar paralysis, Parkinson cerebellar syndrome, vertigo, dizziness. B.P. 120/80; headache.	Vertigo and dizziness, headache and sleep improved after 5 days.
J.T.	58	Cerebral and generalized arteriosclerosis.	Dizzy spells, numbness of right hand and foot, slightly euphoric and impairment of memory. B.P. 170/90.	Dizziness improved, otherwise no change.
V.G.	77	Cerebral and general arteriosclerosis, depression.	Retention impaired, confused, melancholia, agitation. B.P. 168/88.	Confusion improved, consciousness clear.
A.E.	66	Beginning cerebral arteriosclerosis.	Aching and burning pains in feet, staggering gait, insomnia.	Some improvement of gait, pain and sleep.
L.R.	58	Hypertensive and arteriosclerotic encephalomalacia; March 1942 and March 1943 stroke, both times right hemiplegia 2½ years.	Confused, clouded, memory defect especially recent, agitated, antagonistic, apprehensive "going to die." B.P. 196/120.	Acute symptoms improved.
H.A.	63	Cerebral arteriosclerosis.	Irritable, emotionally labile and incontinent, recent memory impaired, dizzy spells, fundi sclerotic vessels. B.P. 118/70.	Dizziness improved. Mentally slightly improved.
G.Y.	65	Cerebral arteriosclerosis, formerly hemorrhage from right superior cerebellar artery—9 years.	Pain in both eyes, more in right. Dizzy spells. Ataxia. Fundi-sclerosis, horizontal nystagmus. B.P. 170/92.	Dizzy spells and pain improved; sleep improved.
G.A.	58	Encephalopathy on hypertensive basis—1½ years.	Comatose, cachetic, right pupil larger than left, stiff neck, had paresis rt. arm, March 1944. B.P. 150/90 to 212/118; bromide level 125 mgms. on admission.	Slight improvement.
C.J.P.	57	Encephalomalacia from hypertension—2 months.	Pressure in rt. side of head, staggering gait, left side of face numb and stiff, increased irritability. B.P. 204/100.	Considerable improvement of symptoms.

PSYCHIATRIC SYNDROMES IN PATIENTS WITH ORGANIC BRAIN DISEASE

1. Diseases of the Basal Ganglia [1]

CHARLES BRENNER, M.D., ARNOLD P. FRIEDMAN, M.D., AND H. HOUSTON MERRITT, M.D.

New York, N. Y.

Diseases of the basal ganglia constitute a chapter of medical knowledge which is still obscure. The outstanding symptoms presented by patients suffering from these diseases are disorders in motor function, but mental disturbances are common and often striking, even to the casual observer. The purpose of this study is to analyze the psychiatric status of a group of patients with various basal ganglia syndromes (Table I.)

TABLE I

Disease or syndrome	No. of living patients	No. of autopsied cases
Hepato-lenticular degeneration..	4	2
Huntington's chorea	2	1
Dystonia musculorum deformans.	4	2
Double athetosis	2	0

Two classes of patients were included: hospital in-patients, all of whom were personally examined by us, and a small number of autopsied patients whose records were considered adequate for psychiatric evaluation. The methods of examination were anamnesis, including medical, personal and social history, general physical and neurological examinations, including hospital laboratory data, mental status and psychometric examination (Wechsler-Bellevue). Reports of the occupational therapists and floor nurses, who had known some of the patients for many years, were also available.

Hepato-lenticular Degeneration (Wilson's Disease).—This disease was first described by Wilson(1) in 1912. Its etiology is still obscure, but the pathological changes, which are quite characteristic, include degeneration and gliosis or even necrosis of both lenticular nuclei, less extensive degeneration in the cerebral cortex and in the white matter of the cerebellum, and hepatic cirrhosis of the portal type. There are usually deposits of pigment in the corneal limbi which are known as Kayser-Fleischer rings. The disease is nearly always fatal within a few years of its onset. The neurological symptoms are exclusively motor and are attributed to involvement of the striatal and cerebellar systems: rigidity, tremors (including the characteristic "wing-beating" tremor), involuntary movements of athetotic and dystonic type, emotional lability, dysarthria, dysphagia and mimetic changes. Clinical or laboratory evidences of liver disease may or may not be present at the time of examination but are usually obvious at some time before death. It may be of interest to note that in 3 of the 6 patients in our series, evidence of liver disease appeared before the first neurologic symptom, preceding it by 5, 5 and 3 years respectively. In 2 of these patients, the initial symptom was ascites, while in the third an attack of abdominal pain necessitated an exploratory laparotomy and the diagnosis of hepatic cirrhosis was established in this way.

Wilson(2) stated that the mental symptoms were variable and included both emotional and intellectual disturbances. He characterized the latter as "narrowing of the mental horizon" and felt the so-called terminal dementia was not a "true" one. Most other authors differ from Wilson on this point. Steinman(3), for example, reported on the mental symptoms of 4 pairs of siblings with the disease. In some of these dementia appeared early, in some late, and in others none was detectable at the time of examination. He agreed with Wilson that the overall picture showed great variation from patient to patient.

In our 6 patients, the psychiatric findings

[1] Read at the 102nd annual meeting of the The American Psychiatric Association, Chicago, Ill., May 27-30, 1946.

From the Division of Neuropsychiatry, Montefiore Hospital and the College of Physicians and Surgeons, Columbia University, New York.

Psychometric tests done by Miss Elaine Grossman.

were as follows: 3 of the 4 patients whom we examined ourselves showed no evidence of intellectual deterioration at the time of examination (6, 6 and 1 year respectively after the onset of the first neurological symptoms), while the fourth (who was examined 5 years after the onset of her first symptoms) showed evident deterioration. This patient had an I.Q. of 73 on the verbal part of the Wechsler-Bellevue test with the highest relative scores in information and digits and the lowest in arithmetical reasoning and similarities. In the performance part of the test, she achieved an I.Q. of 57 (the digit symbol part of the test was not administered because of the patient's motor difficulty). She failed completely on the block designs, showed poor ability to comprehend and organize a total situation (picture arrangement) or to recognize and identify familiar objects and forms. Since this patient had graduated from the eighth grade of school and had been a notions buyer for a small department store before her illness, the scores she achieved on test were considered to indicate intellectual deterioration.

Of chief interest to us was the fact that in all 6 patients emotional tension or the feeling that they were performing under pressure accentuated the severity of the motor difficulties. Such changes in the severity of symptoms might be either brief or long lasting. In one case for example, there was a steady improvement in motor capacity over a ten-month period during which the patient was removed from his family, whom he bitterly resented, to a friendly and sympathetic environment. All of this improvement rapidly disappeared when he was told that he must return to his family, and when he finally did so, within 2 weeks after his return he had regressed completely to his original state of disability. Moreover, brief exacerbations of symptoms could be elicited in any of the patients by a suitable test situation in which the patient felt the need to perform under pressure.

None of our patients exhibited any striking or constant peculiarities of mental content. The mood was very different in different patients or in the same patient at different times. It might be cheerful, euphoric, irritable, depressed or apathetic.

Huntington's Chorea.—This disease was first described in 1812 by George Huntington(4) a practitioner on Long Island. The disease is classically familial but many sporadic cases occur. The characteristic pathological findings are atrophy of the cerebral cortex, the caudate nucleus and the putamen. The clinical course is progressive. The neurologic symptoms are involuntary, choreic and athetotic movements which begin insidiously, often in the proximal muscles of the extremities, eventually spreading to involve the entire musculature.

Emotional instability may be the first mental symptom but signs of intellectual deficit always appear sooner or later. Hochheimer (5) from an intensive study of 3 mild cases of the disease, concluded that the essential psychological disturbance is inability to remain on a single train of thought or to remain concentrated on a single thought at all. This symptom, which the author called a disturbance of "motor thought," was also noted by Lion and Kahn(6) in 1 of 10 cases of Huntington's chorea which they studied. Other authors do not appear to have remarked upon it.

Only 1 of our 3 patients had a positive family history. Otherwise they were typical cases of the disease with severe, generalized chorea and evidence of intellectual deterioration. One of the 2 living patients received the Wechsler-Bellevue test. His I.Q. on the verbal scale was 74; that on the performance scale could not be measured because of his motor difficulty. His best performance was in arithmetical reasoning but he was unable to repeat any digits backward and did very poorly on similarities. Before the onset of his illness he had been a salesman of electrical supplies.

Both of the living patients were ambulatory. They showed marked diminution of the involuntary movements with concentration of attention. For example, one of them, whose chorea during the examination was so severe that he could hardly sit still, lost most of his involuntary movements when he picked up a newspaper to read aloud to us and was able to sit and read in relative quiet. On the other hand, unpleasant experiences or failures in attempting to perform a given task were followed by an increase in the choreic movements.

Conversation with these patients is often

difficult because their speech is so dysarthric that it is nearly unintelligible. Attempting to assess such a patient's mental content is therefore a laborious and usually unsatisfactory task. The incessant facial grimaces and bodily contortions similarly handicap the examiner in attempting to judge objectively the patient's mood and degree of interest in his environment. With due regard to these limitations we found the mental content of the 2 patients whom we examined personally to be remarkable only for defective judgment and insight which were considered to be related to their intellectual deficit. The mood of one patient was rather irritable, that of the other, indifferent and flat. This second patient had been hospitalized for a depression with paranoid trends for about one year, two and one half years before the onset of his choreic movements. No similar psychotic symptoms were apparent at any time during the eleven years which had elapsed between the onset of his neurological symptoms and the time of his examination. The records of the autopsied patient, whom we did not examine, described him as being euphoric and apparently hallucinated in the visual sphere. This patient was bedridden and died 4 months after hospital entry.

Dystonia Musculorum Deformans.—Oppenheim(7) in 1911 described 4 cases which had peculiar muscular spasms involving principally the thighs, pelvis and spine. He proposed the term dystonia musculorum deformans for this group of cases and stressed the organic nature of the syndrome. Among previous workers, Schwalbe(8) and Ziehen (9) reported on similar cases but stated that the abnormal movements were hysterical or other neurotic manifestations.

Although it is now generally agreed that Oppenheim was right in considering the movements to be organic rather than psychogenic in etiology, the original conception of dystonia as a disease entity has been challenged by numerous investigators. Herz(10) in a recent review of the subject, stated that the dystonic movements appearing with Wilson's disease, Huntington's chorea, epidemic encephalitis or with trauma, infections, vascular insults, etc., should be separated from the group of cases with gradual development of dystonic movements and postures and no recognizable etiologic factors at the onset. He suggested that the diagnosis of dystonia should be reserved for this latter group.

The etiology of this disturbance is completely unknown and, perhaps because the duration of life is not greatly affected by the disease, the nature of the underlying pathological process is not too well known either. Davison and Goodhart(11) have reported lesions of the corpus striatum in a group of dystonic patients, one of whom had associated nerve cell loss in the cerebral cortex. The neurological symptoms consist of involuntary movements of the trunk and extremities which differ from those of athetosis only in that they are so much slower. In some patients there are few dystonic movements but marked rigidity and abnormal postural attitudes. This syndrome is referred to as the myostatic or akinetic type of dystonia.

The psychiatric findings of interest in our 6 patients were as follows. The abnormal movements were made worse by any voluntary effort in all 4 of the patients whom we examined personally and a note to the same effect was found in the record of one of the two autopsied cases. One patient had frequent "negative movements," that is, his hand or fingers would move in exactly the opposite direction from that in which he tried to make them move.

Intellectual deterioration was present in 1 patient, absent in 3 and impossible to estimate in the other 2 because of difficulty in communicating with them. It might be worth mentioning that when a dystonic patient's motor disability is severe, one generally underestimates his intellectual ability at first and then when the patient does better than one had expected, the tendency is to overestimate it. One of the autopsied patients, who had been mentally defective from birth, showed evidence of considerable cellular loss in the cerebral cortex.

Emotional outbursts or lability were noted in 2 patients. None of the patients was ambulatory, but those who could get about in a wheel chair had good social contact with the other patients. One of them spent much of his time at a typewriter in the occupational therapy department laboriously writing a novel. The mental content of those patients in whom it could be determined, was normal.

Double Athetosis.—The syndrome of athe-

tosis (literally, "without fixed position") was recognized and named by Hammond(12) in 1871. The slow, writhing movements of the limbs, body and face which he described may be associated with birth injuries, vascular accidents, syphilis of the central nervous system, encephalitis, Wilson's disease or Huntington's chorea. Even the precise location in the brain of the lesion or lesions required to produce athetotic movements is not known, though it is presumed to be somewhere in the striatal system. However, a particular condition referred to as double athetosis has been thought by some to be a specific disease entity. It usually starts immediately after birth but is not recognized at that period because infantile movements are normally incoordinate. The child has bilateral, abnormal movements of the extremities and face. It learns to walk, if at all, at about 3 to 4 years of age and the gait is usually staggering or stumbling in type. Dsyphagia and explosive speech are prominent. Epileptiform convulsions usually appear but according to many observers the mentality is not affected.

We can report on only 2 patients with this syndrome. Both were considered to be mentally defective on the Wechsler-Bellevue test though it was not possible to assign a valid, precise, numerical score to their performance because of their motor and speech difficulties. As in the case of the severely dystonic patients, one tended at first to underestimate and then to overestimate their intellectual ability.

Emotional excitement or tension was accompanied by an increase in the severity of both patients' involuntary movements. Of particular interest was the observation that when the attention of the patient was focussed on a specific task, the abnormal movements diminished in the parts of the body from which the patient's attention had been diverted. This is frequently true of abnormal movements of hysterical type and has indeed been considered by some to be diagnostic of hysteria, a view which is clearly not correct, as our patients demonstrated. Both patients were cheerful and friendly and were well adjusted to the routine of the hospital where they had lived for many years. The mental content was not remarkable in either.

DISCUSSION

Our findings are in agreement with those of many other authors that the mental symptoms shown by patients with the various basal ganglia diseases are consistent chiefly in variability. There is no evidence that most or all of the patients in any of the diagnostic categories studied here show similar disturbances of either mood or ideation. This finding is in agreement with the reports of Steinham(3) and Lion and Kahn(6). The presence or absence of intellectual deterioration is readily correlated with the degree of cortical damage which is known to occur in the various diseases. Such deterioration is most frequent in Huntington's chorea, the disease in which cortical changes are most prominent pathologically, and least frequent in dystonia. In the case of hepato-lenticular degeneration, evidences of intellectual deterioration may appear early or late but are apparently always present eventually. Both of our patients with double athetosis were mentally defective and had always been so. However, as is well known, some patients with this disease are of normal or even superior intelligence. In our 2 patients there had been no change in intellectual capacity for many years at least.

There was one striking feature of the behavior of these patients on which we wish to place particular emphasis. This was the effect which their psychic state had on their abnormal movements. Under the stress of unpleasant emotional tension the abnormal movements would become worse, often much worse, with corresponding improvement under more favorable circumstances. Moreover the involuntary movements of the patients with Huntington's chorea grew less severe when the patients concentrated on a specific task. This improvement was generalized, but most noticeable in the parts of the body directly concerned in carrying out the task. A similar phenomenon was observable in the patients with double athetosis, but with the difference that in these patients the improvement was limited to the parts of the body from which attention was diverted while carrying out the task. This sort of fluctuation in the severity of involuntary movements with changes in attention is often seen in hysterical patients and it is sometimes

considered to be diagnostic of that disease. The incorrectness of such an interpretation is clearly shown by the findings in our group of patients with diseases of the basal ganglia.

We venture to propose the word "psychosensitive" to describe these abnormal movements in order to emphasize the relation between the severity of the movements and the patient's psychic state. The similarity of this word to the widely used term "psychogenic" should also call attention to the frequent difficulty in differentiating diagnostically between basal ganglia disease and psychoneurosis (single or multiple tics). Unless one is familiar with the bizarre movements presented by patients with basal ganglia disease the differentiation may be extremely difficult and in occasional cases in which the symptoms are not yet advanced, it is quite impossible to be sure of a diagnosis at the time of examination.

Finally the word "psychosensitive," with its emphasis on the interrelation between the severity of the involuntary movements and the psychic state of the patient, may remind us that skillful and appropriate psychotherapy should be used in these cases when possible in the reasonable hope that symptomatic improvement will ensue. In addition to psychotherapeutic interviews when feasible, one should aim toward amelioration of unfavorable emotional stresses by providing the patient with a friendly, accepting and protecting environment with opportunities for as much emotional gratification as possible in the forms of activities (occupational therapy) and interpersonal relationships. In the absence of any etiologically directed form of therapy, psychotherapy must, for the present, occupy first place in the therapeutic armamentarium, despite its purely symptomatic nature. The case cited in the section on hepato-lenticular degeneration will serve as an example of the improvement that may follow successful psychotherapy even in a patient with progressive disease of the central nervous system.

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THE EFFECT OF ANOXIA AS MEASURED BY THE ELECTROENCEPHALOGRAM AND THE INTERACTION CHRONOGRAM ON PSYCHONEUROTIC PATIENTS[1]

JACOB E. FINESINGER, M. D., ERICH LINDEMANN, M. D., MARY A. B. BRAZIER, PH. D.

AND

ELIOT D. CHAPPLE, PH. D.

Boston, Mass.

During the past ten years we have been interested in investigating the autonomic nervous system in the psychoneuroses. Previous studies have shown that psychoneurotic patients differ from control subjects in respect to heart rate(1), ventilation(2), sighing respiration(3), and other aspects of the respiratory pattern(4) during basal conditions and during sensory and ideational stimuli. More recent studies(5, 6) from this and other laboratories indicated that psychoneurotic patients, especially those with anxiety neurosis and neurocirculatory asthenia, show a disturbance in the oxygen uptake or oxygen utilizing mechanisms. Further in a series of studies on the selection of aircraft pilots, in collaboration with the Bureau of Medicine and Surgery of the U. S. Navy, a correlation was found between failure in flight training and behavior and between failure in flight training and autonomic overactivity(7), and certain characteristics of behavior which are found in states of anoxia.

In pursuing this problem we felt it wise to study the direct effect of inhaling mixtures low in oxygen upon the CNS activity as determined by the electroencephalogram and behavior as measured by the interaction chronogram. It is the results of these latter studies that are presented in this paper.

The effects of anoxia on the EEG in man were studied by Berger(8), and later by many others, most notably Gibbs and Davis (9), Lennox, Gibbs, and Gibbs(10), Gibbs, Williams, and Gibbs(11), Davis, Davis, and Thompson(12), and Gerard(13) and his collaborators. All investigators report that in breathing mixtures low in oxygen a shift to the slower frequencies occurs in the EEG.

Many observations are available on the effects of anoxia on behavior and on certain psychological functions. MacFarland(14), Barach and Kagan(15) describe changes in behavior during anoxia. These changes, not so readily measurable, refer to loss of emotional control, excitement, garrulousness and destructiveness on the one hand or apathy and unresponsiveness on the other. Simultaneous observations on the EEG and the performance of subjects as exemplified by the critical flicker fusion frequency, as studied by Gellhorn and Hailman(16), indicate a parallelism between the degree of change in critical potentials and in the critical fusion frequency. The effects of anoxia on more elaborate psychomotor responses and in phantasy formation(17) have also been reported. In the present study a series of psychoneurotic patients and normal control subjects was interviewed by the use of a standardized procedure while sitting in an anoxia chamber and while breathing mixtures of room air (approximately 21% O_2) and while breathing mixtures low in oxygen. Electroencephalographic records were made at various intervals throughout the procedure and the activity as indicated by the length of the periods of talk and gestures was measured throughout both interviews(18). Data are presented comparing the results obtained at low oxygen levels with those obtained while breathing air.

[1] Read at the 102nd annual meeting of The American Psychiatric Association, Chicago, Ill., May 27-30, 1946.

From the Department of Psychiatry at the Massachusetts General Hospital, the Massachusetts General Hospital branch of the Hall-Mercer Hospital, and the Department of Neurology and Psychiatry of the Harvard Medical School.

This study was aided by a grant from the Milton Fund.

Procedure

The subjects, both patients and normal controls, were subjected to the same procedure. The subjects were all under non-basal conditions, and the experiments were all done in the morning. Each subject was given 50 c.c. of 50% glucose p.o. while sitting in an adjacent laboratory and the scalp electrodes were attached. The subject then sat in the anoxia chamber while the leads from the scalp electrodes were attached to cables leading to the EEG apparatus. A capillary blood sample was drawn for the determination of the blood sugar level. This was done because we have previously shown(19) that blood sugar levels of 110 mgm./100 c.c. and below might influence the frequency of cortical potentials. After this the subject was asked to close his eyes and an EEG record was obtained for a period of 2 minutes. This served as a base line for the EEG determinations. The hood of the anoxia chamber was then closed and the patient was then interviewed. The anoxia chamber was connected directly with a spirometer, whose capacity was 350 liters. A circulatory pump in the circuit insured complete mixing of gas in the spirometer and in the chamber. The CO_2 was absorbed by means of soda lime, through which the gas was pumped. At the beginning of the experiment the spirometer contained about 50 liters of room air.

After the first interview which lasted about 30 minutes an amount of N_2 was introduced into the spirometer to attain the desired oxygen mixture. It was found that a 10 minute mixing period was sufficient to obtain adequate mixing. After the mixing period the subject was interviewed again for a similar period. When the second interview had been completed, the hood was then lifted and the subject was in most instances asked to describe his reactions during the experiment. Samples of gas were taken from the chamber every 15 minutes from the beginning to the end of the entire experiment for analysis of oxygen and CO_2. Electroencephalographic records were obtained every 15 minutes throughout the interview and continuously for a five-minute period at the very end of the experiment and throughout the whole period while the hood was lifted and for 3-5 minutes after that. Each of the EEG runs was at least two minutes in duration and all were recorded with the subject sitting quietly with his eyes closed.

The Interview

In the course of our work it was found expedient to adopt a standard, or controlled, interview. Experiment showed that variations in the interaction rate of the interviewer brought about specific changes in the interaction rate of the subject, and the interviewer—unless very skilled—tended to persist in his natural rate. It was possible to set constants for the differences between interviewers, but it was more effective to get them to control their behavior by learning to follow a specific timing pattern. This pattern, made up of standardized variations, formed the standard experimental interview for determining the effect of controlled changes in the interviewer's behavior upon the subject's own pattern. A detailed description of the interview follows:

The interview is divided into 5 periods, each of which is introduced by a general topical question relating to the subject's own experience. Three of the periods, the 1st, 3rd, and 5th, are alike in the prescriptions for the interviewer's behavior, although the 1st takes 15 minutes, while the other 2 last 5 minutes only. In these 3 periods, the interviewer, after introducing the general topic (such as: "How do you get along at home?") is instructed to wait one or two seconds before replying when the subject stops and to use only such encouraging phrases as "Isn't that interesting," "Why," "Can you give me an example of that?," or to rephrase the last phrases of what the subject has just said.

After the first 15 minute period, a new topic is introduced by the interviewer and during the period devoted to that topic, the interviewer is instructed to change his behavior systematically from that previously used. When the subject stops talking, the interviewer waits 10 seconds before replying. If the subject starts to talk without waiting for the interviewer, the interviewer waits again when he pauses, and repeats the procedure ten times. Only if the subject waits for the full 10 seconds after one of his actions will the interviewer reply, rephrasing the original question or the subject's previous answer. This period during which the interviewer fails to reply is followed by a five-minute adjustment period introduced by a question on a new topic. At the end of the 5 minutes, a new topic is introduced and the interviewer now starts to talk during the subject's first reply and tries to talk him down, using a normal voice, and rephrasing the question just asked. These interruptions are repeated ten times. If the subject does not reply after the inter-

viewer stops interrupting—that is, the interviewer has succeeded in out-talking him—then the interviewer waits 3 seconds and then asks another question. The next and final period is a period of readjustment of 5 minutes, in which the interviewer tries to adjust to the subject.

In order to judge the time accurately, a large clock with a sweep second hand is placed behind the subject, where the interviewer can see it without having to turn his head. The five periods should take approximately 25 to 30 minutes, and on the graph each period is marked by the signal marker, which is pushed by the observer when the key question is asked.

Data

In the present study experiments were performed on 67 patients and on 36 control subjects. The patients were individuals treated on the wards and in the Out-patient Department of the Psychiatric Department of the Massachusetts General Hospital and individuals undergoing treatment at the U. S. Navy Hospital at Chelsea, Mass. Most of the patients were diagnosed as having psychoneuroses of various kinds—the largest group consisting of patients with anxiety neurosis. They ranged in age from 15 to 43—there were 20 females and 16 males. There were 36 control subjects who were chosen from the medical students, doctors, hospital technicians and W.A.V.E.S. working at the Chelsea Navy Hospital. Their ages ranged from 19 to 38. The control subjects were not under treatment. Complete data as to the presence or absence of symptoms for the control group is not available. However, in a small series of 10 control subjects who were interviewed, one subject merited a diagnosis of psychoneurosis. Two subjects showed evidence of occasional psychoneurotic symptoms. As far as could be determined the other 7 had no psychoneurotic symptoms. If this sample is reliable, one would have to conclude that a small percentage of the control subjects merited the diagnosis of psychoneurosis.

General Reactions to Anoxia

On the whole the changes in behavior noticeable were of two distinct types. At one extreme subjects became restless, appeared distressed and demanded to have permission to leave the anoxia chamber—this was likely to happen during the mixing period. At the other extreme subjects became more and more uncommunicative and then ceased to respond altogether so that the experiment had to be interrupted. These two extremes: acute apprehension with restlessness on the one side and apathy with failure to respond on the other side, seemed to be two poles of a continuous series presenting various combinations of the factors mentioned. It is of interest that the restless state was often attended by phenomena suggesting autonomic stimulation; sighing respiration, flushed face, profuse sweating, while the apathetic state seemed to develop insidiously without any dramatic manifestations.

In addition to the detailed observations to be presented below, there were certain general differences in the reactions of the subjects at low oxygen. Approximately 20% of the subjects were unable to finish the experiment. About 10% discontinued because they fainted, felt faint, dizzy or were nauseated. There was little difference between patients and controls in these items. Two of the patients were excited and felt jittery, and 2 of the patients were uncooperative.

Many of the subjects complained of subjective feelings in response to anoxia. About half of the patients and control subjects complained of fatigue, about one-fifth of the patients and controls complained of dizziness. Approximately 40% of the patients complained of headache, restlessness and tenseness. These complaints were mentioned by only two of the control subjects. Difficulties in thinking, and "heaviness," were mentioned by one-third of the control subjects, but by only 2 of the patients. A few patients and a few control subjects complained of numbness, sensation in their ears and faintness. Three of the patients complained of fear during the experiment and three of the control subjects mentioned breathing difficulties.

In addition to the subjective sensations reported, the effects of anoxia could also be observed in the manner in which the patients communicated with the interviewer. A change in the flow of speech was noted. During low oxygen the pauses before answering the interviewer's questions became longer. Sometimes there was a complete failure to respond to the questions of the interviewer. At times the answers to the interviewer's questions became short and often monosyl-

labic. Occasionally there was an increase in the number of repetitions. Often these were simple repetitions of an idea, and some subjects repeated phrases without stimulation by the interviewer's questions. In many cases there was an apparent reduction in the choice of words and the vocabulary seemed to be constricted and it was as though the patient were operating on a simple level of language structure. In many instances there was a marked change in the rate of speech and it seemed as though the subject were less able to follow and to respond to the interviewer's questions. The subjects tended to lose contact with the interviewer and would continue to speak in an irrelevant fashion. It was the impression of the observers that the subjects seemed more preoccupied with internal phenomena.

There was some evidence that the subjects tended to shortcut their ideas, leaving out connectives. In a few instances certain symptoms which the patients had were apparently aggravated by low oxygen. Two of the group began to stutter toward the end of the interviewing.

The Effect of Anoxia on the Electroencephalogram

As mentioned above Berger was the first to show that lowering of the O_2 concentration of the inspired air slowed the rate of the cortical potentials and this observation has since been abundantly confirmed by other workers. It was our purpose in this study to apply this fact as an objective method for assessing the degree of response of an individual to low O_2 concentrations. This entailed the development of a method of measurement of these rhythms in order to be able to quantitate any changes which took place. As the purpose of any such index of measurement was to demonstrate slowing of rate, a distribution curve was made of the frequencies up to 17 cycles per second present in a two-minute sample of each electroencephalographic recording. One such is shown in Fig. 1. The method for preparing such a distribution curve has been described in a previous paper(20). In Fig. 1 a normal EEG is seen at the top and the curve of its frequency analysis is shown below. In this particular example the greater portion of the record was occupied by waves of 10 and 10.5 cycles per second frequency with lesser amounts of other frequencies. If any slowing of this EEG were to take place due to the

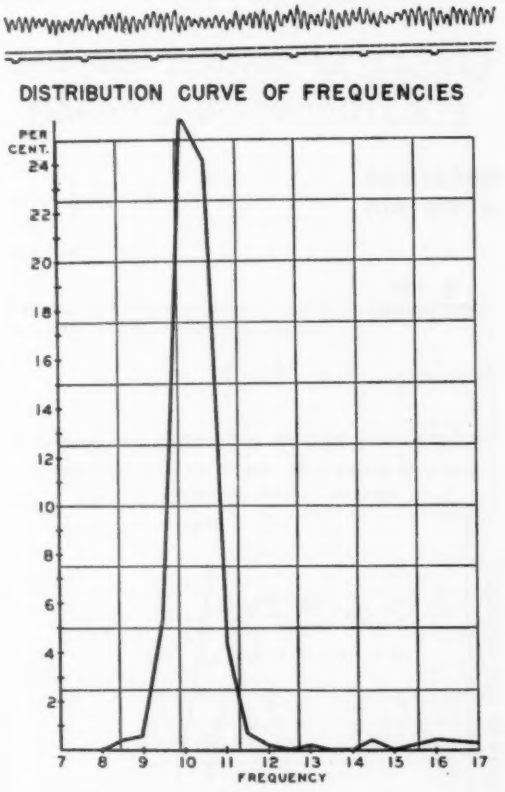

Fig. 1.

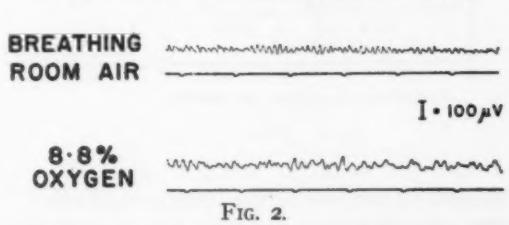

Fig. 2.

subject's breathing low O_2, one would expect the whole distribution curve to move to the left into the range of slower frequencies. This is, in fact, what was found in 85% of the subjects tested (59 persons). In some cases the slowing was so gross that it could easily be seen by inspection of the original tracing and one such example is shown in Fig. 2.

In some records, however, one would have more difficulty in deciding whether a slowing of a rate had taken place if only inspection of the original tracing were used. For example, in Fig. 3 the EEG is shown of a

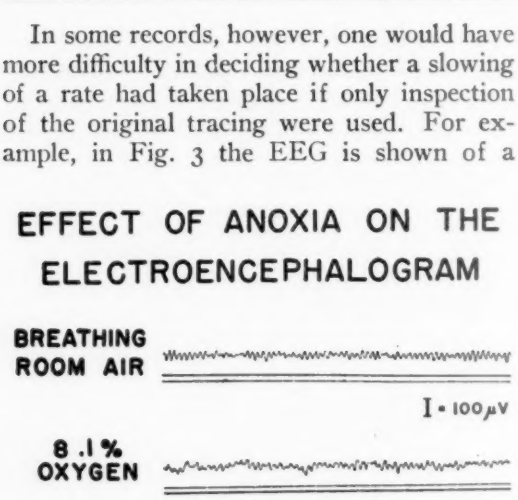

FIG. 3.

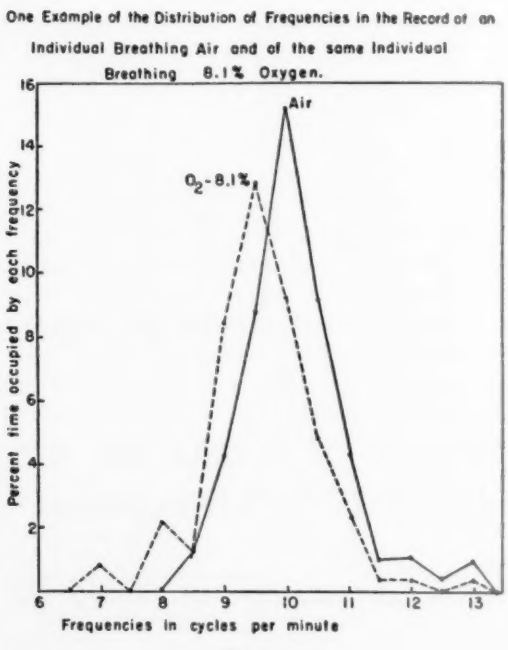
One Example of the Distribution of Frequencies in the Record of an Individual Breathing Air and of the same Individual Breathing 8.1% Oxygen.
Air
O2 - 8.1%
Percent time occupied by each frequency
Frequencies in cycles per minute

FIG. 4.

subject in air and when breathing 8.1% O_2. The distribution curve of the frequencies, however, which is shown in Fig. 4 demonstrates quite clearly a significant slowing.

Since some index was wanted for use as a quantitative measurement to correlate with other factors some expression of this shift of the curve to the slower frequency was searched for which could be expressed as an integer. There are many features of this shift which might be used as measurement. For example, the amount of activity slower than a certain frequency could be used and this would obviously be greater in the left hand curve than in the right and would give some measurement of the slowing of the EEG, or one could use the shift of the peak of the curve which we call the dominant frequency since that is the frequency which dominates the whole of the electroencephalographic tracing. It is obvious that the dominant frequency is not an infallible index,

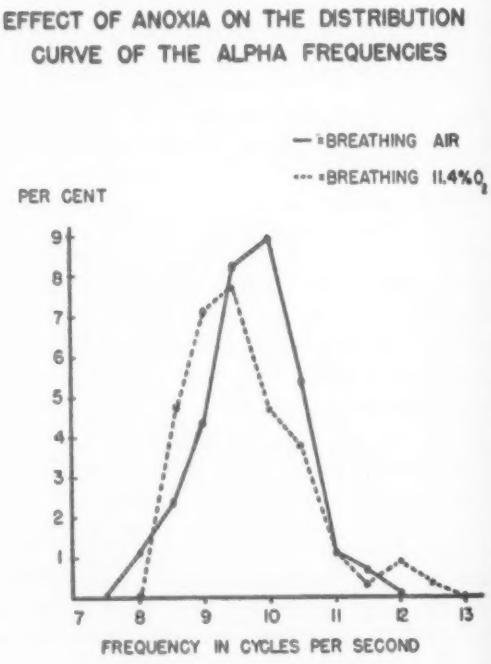
EFFECT OF ANOXIA ON THE DISTRIBUTION CURVE OF THE ALPHA FREQUENCIES
— = BREATHING AIR
--- = BREATHING 11.4% O2
PER CENT
FREQUENCY IN CYCLES PER SECOND

FIG. 5.

since the body of the curve could shift to the left without a change in the peak, but it has proved to be a reasonably adequate measurement of slowing. Since all aspects of the data cannot be presented here this will be the one measurement discussed and used in the computations which follow. As noted above, its use does mask the effect of anoxia in some cases and thus gives an understatement of the effect of low O_2 on the EEG.

Fig. 5 is another example of a shift of the curve to the left when breathing low O_2, in this case only as low as 11.4%. In any large group of individuals breathing air the dominant frequency varies from person to person, but when charted out shows a distribution curve around the most common value for

normal people which is 10.0 to 10.5 cycles per second(20).

The distribution curve of the dominant frequencies of 37 individuals breathing air charted as a solid line is shown in Fig. 6. On the same figure the broken line shows the shift for these same 37 individuals with O_2 levels below 11%. This figure shows a difference between the EEG of a group of people in air and at low O_2 levels, but it does not give information as to whether this

Distribution of Dominant Frequencies Among 37 Subjects

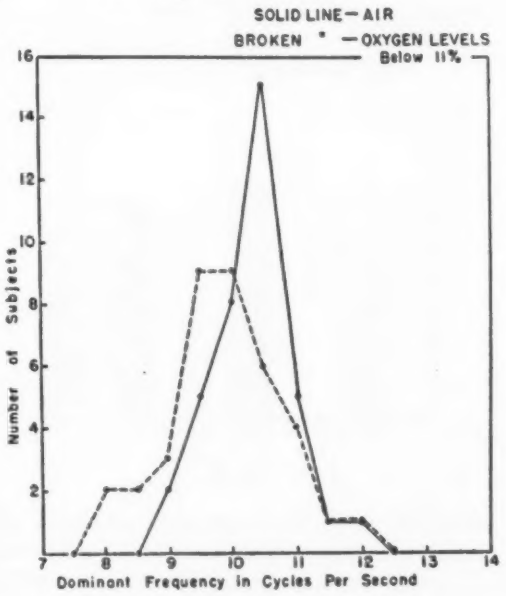

FIG. 6.

slowing takes place suddenly or whether it is a response which is graded with the level of anoxia involved.

In Fig. 7 this same group of 57 subjects has been divided into two portions: those who were breathing O_2 levels below 10%; and those between 10 and 11%. It is immediately clear that the average slowing is greater the lower the O_2 levels. Here then is one variable which affects the degree of slowing. In other words the degree of slowing is dependent upon the degree of anoxia. There is, however, another variable at work and this is the CO_2 level. Great technical difficulty was experienced in eliminating all the expired CO_2 from the circuit since it accumulates so quickly that some inevitably remains to be rebreathed. In none of the 57 cases reported here was the CO_2 over one-half of 1%, but a marked difference was found between the degree of response to low O_2 between those subjects who were breathing less than 0.3% CO_2 and those who were breathing between .3 and .5% CO_2. There was a greater slowing of the EEG at the lower CO_2 levels.

MEAN CHANGE IN DOMINANT FREQUENCY AT VARIOUS LEVELS OF ANOXIA

OXYGEN LEVEL	NO. OF SUBJECTS	MEAN SLOWING
BELOW 10%	29	−0.4 CYCLES
10% UP TO 11%	28	−0.2 CYCLES

FIG. 7.

INFLUENCE OF CO_2 LEVEL ON DEGREE OF SLOWING OF EEG AT TWO LEVELS OF ANOXIA

	CO_2 BELOW .3%	CO_2 .3% TO .5%
O_2 BELOW 10%	−1.1 N= 5	−0.3 N= 24
O_2 10% UP TO 11%	−0.4 N= 10	−0.1 N= 18

SLOWING OF DOMINANT FREQUENCY (IN CYCLES PER SEC)

FIG. 8.

In Fig. 8 both variables are reported—the degree of anoxia and the amount of CO_2 rebreathed. Where both the O_2 and the CO_2 were low there was the greatest slowing of the EEG. Where the O_2 is only reduced to the 10 or 11% level and the CO_2 is over 0.3%, the dominant frequency shows a mean slowing of −.3 cycles per second.

The influence of CO_2 on the reaction of the EEG was expected from all the work that has been done in this field, but it was an unexpected result to find that CO_2 exerted

its influence at such low concentrations as 0.3%.

There seemed to be little difference between the patients and the control subjects in their reactions to anoxia when the records were analyzed as described above.

Effect of Anoxia on the Interaction Chronogram

The interaction chronograph is operated by an observer seated behind a screen through which a one-way mirror gives a view of the interview. In front of him is a small box with two keys, one for the subject and one for the interviewer, and a push-button switch, which operates as a signal marker. All he has to do is press down the appropriate key when either person starts to act—by talking, smiling, nodding or gesturing—and hold it down until the action is over. He watches closely the visible activity of the facial muscles, recording contractions as activity and relaxation as inactivity. Any fixed grimace or nervous twitching which is not part of a sequence of interactions is not recorded.

By this simple operation, the five pens of the chronograph trace out five curves which record the relative duration of the subject's periods of activity and of silence. Two of these, the activity and the speed curves, record the subject's behavior; the other three record aspects of two individuals' interaction with each other. They are the subject's adjustment curve, the interviewer's adjustment curve, and the initiative-dominance curve. For the purpose of this report the activity curve alone will be considered.

Activity Curve.—When the subject's key is pressed down first, a pen starts to move along a vertical bar in a positive, or upward, direction, and continues on until the action ends. When the subject's key is released at the end of his action, the pen reverses its course and moves downward in a negative direction while the subject is silent. Each time the subject begins to act, a mechanism moves the paper one step to the left. Thus the resulting graph represents the cumulative sum of the differences of the actions and inactions. If, for instance, a man talks on for 60 seconds and is silent for only 1 before beginning again, the curve will ascend at the rate of 59 seconds for the complete unit of action and inaction: if he is silent for 60 seconds and talks for only 1, the curve will descend with the obverse slope.

The activity values were obtained by direct measurement from the charts as produced by the interaction chronograph. For the purpose of this report the data on two variables will be presented: the A-S values and the A values.

The A-S value represents in seconds the algebraic difference between the period of activity (talk and gesture) and the period of inactivity (silence). The values were obtained by measuring (for a period of the interview or for the total interview) the cumulative height of the curve. Similar measurements were made for the interview while the patient was breathing air in the chamber and for the interview while the patient was breathing various low oxygen mixtures. The composition of the air in the chamber was from 21 to 19% O_2, and the CO_2 varied from .5 to .18%. "Low oxygen levels" refers to oxygen levels of 15% and below.

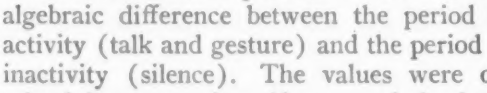

Fig. 9.

In a series of 28 patients and 14 control subjects a decrease in activity as described by the A-S curve occurred in about 77% of the subjects, when the values for the total interview are considered. Similar changes were observed in 60% of the subjects when the values were calculated for the first 15 minutes of the interview. A slightly higher percentage of individuals (80%) showed a decrease in activity when the values for the last 5 minutes of the interview were taken (Fig. 9).

On comparing patients and control subjects (Fig. 10) the same percentage (75%) of each showed a decrease in activity for the total interview period as described by the A-S curve. The mean decrease for the patients was 1.1 seconds and for the control subjects .65 seconds.

Relation of Activity in Air to Changes at Low Oxygen Levels.—The results of this comparison are presented in Figs. 11 and 12. It can be seen that subjects with high initial activity rates as determined by the A-S value showed greater changes at low oxygen, whereas subjects with initial low activity rate tended to show an increase in activity at low oxygen. All of the 7 subjects with

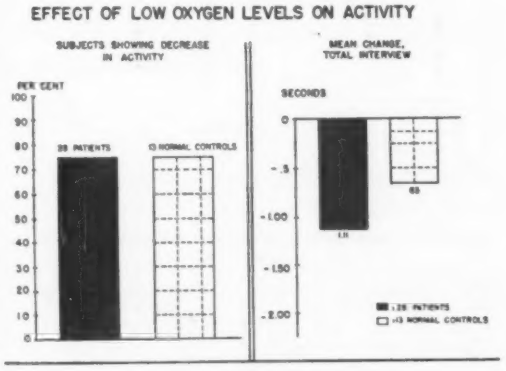

FIG. 10.

activity rates of 3 seconds and over per interaction unit showed a decrease at low oxygen. The mean value for this decrease was 2.5 seconds per interaction unit for the total interview and 5 seconds for the last 5 minutes of the interview. Twelve out of 15 subjects (80%) whose initial values were from 2.99 to 1.00 showed a decrease. The mean change for these 15 subjects was a decrease to 1 second for the total interview and a decrease of 3 seconds for the last 5 minutes of the interview. Ten out of 14 subjects (75%) whose initial values were from .99 to −1.99 showed a decrease. The mean change of these subjects was a decrease of .5 seconds for the total interview and 1.5 seconds for the last five minutes of the interview. Only 2 of 6 subjects, whose initial value was 2.00 and below, showed a decrease at low oxygen. The remaining 4 showed an increase during low oxygen. The mean values for these subjects at low oxygen indicated an increase in activity of .5 seconds for the total interview and a slight decrease of .25 seconds for the last 5 minutes of the interview. The same relationship holds for the larger series of 35 patients and 30 control subjects.

For comparison the value of activity alone was calculated from the charts produced by the interaction chronograph and is presented

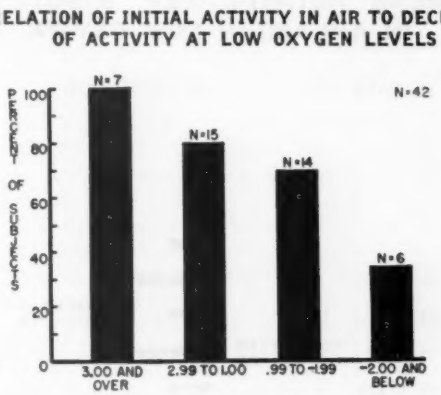

FIG. 11.

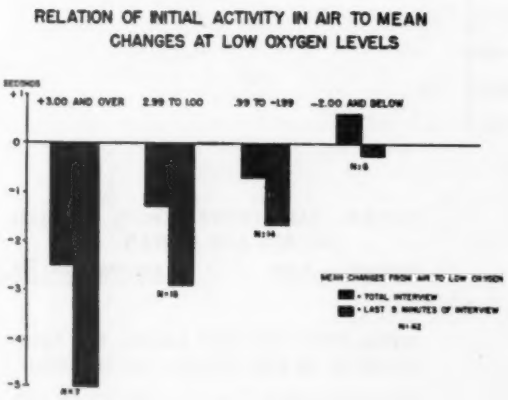

FIG. 12.

as mean activity in seconds per minute for the total interview. The mean activity rate for the patients for the entire interview was 32.6 seconds per minute, which was lower than that for the control subjects. Both the patients and the control subjects showed a decrease in activity at low O_2 (15% and below). This change, however, was greater for the patients than it was for the control subjects (Fig. 13). It was found also that subjects with high initial activity rates in air tended to show greater changes in anoxia than did those subjects whose initial rates were low.

If the change in activity during anoxia is merely a function of the initial activity rate, one would not expect the patients whose initial activity rate in air was lower to show greater changes in low oxygen. This would indicate that a second factor in determining the effect of low oxygen is the disease.

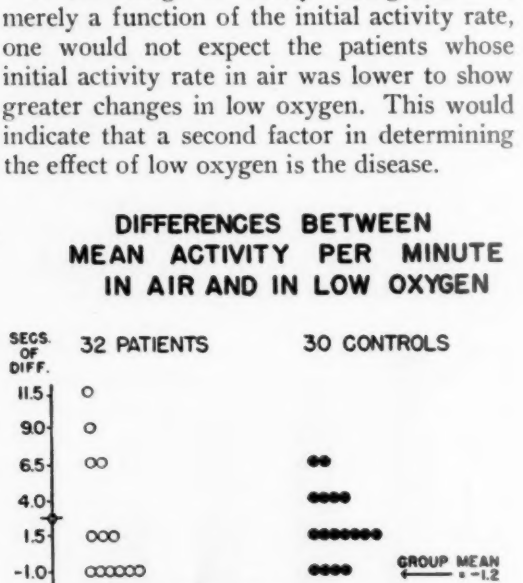

FIG. 13.

Relation Between the Electroencephalogram and Activity.—In an attempt to understand other factors which could play a role in producing the changes in activity at low oxygen, the relationship between the EEG and the activity was investigated. In a series of 15 subjects it was found that at low oxygen levels the subjects who showed the greatest decrease in activity in low oxygen showed little or no change in the EEG, whereas the subjects who showed little change in activity during low oxygen or whose activity rate was increased during low oxygen showed the greatest changes in EEG. This relationship held whether activity was measured in terms of activity per minute (Fig. 14) or activity per interaction unit (Fig. 15). This relationship, however, did not hold when the oxygen levels between 10.5 and 15% were considered. This would

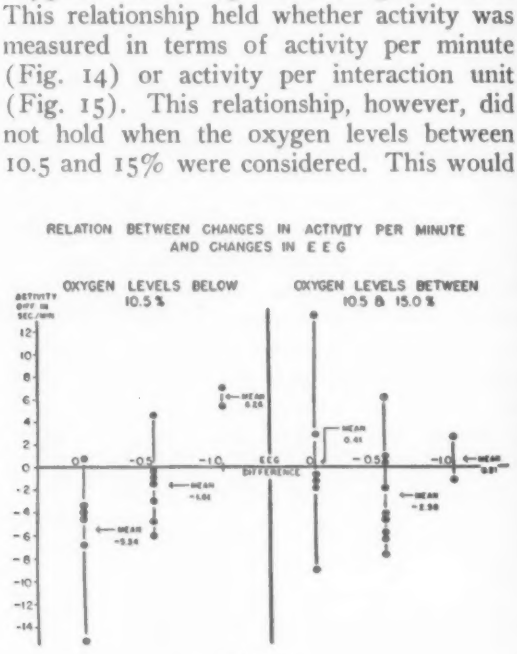
RELATION BETWEEN CHANGES IN ACTIVITY PER MINUTE AND CHANGES IN E E G
OXYGEN LEVELS BELOW 10.5 %
OXYGEN LEVELS BETWEEN 10.5 & 15.0 %
EEG DIFFERENCE

FIG. 14.

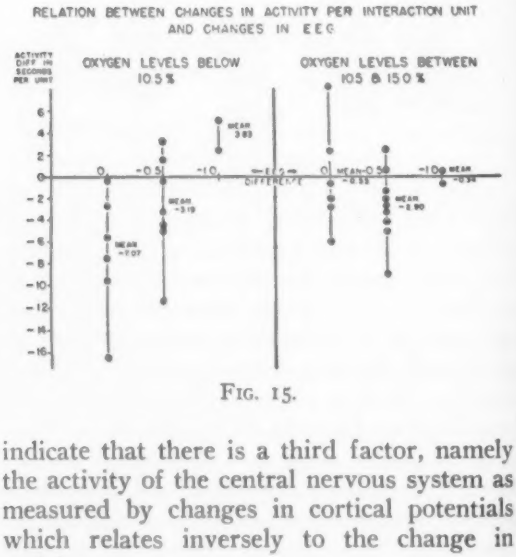
RELATION BETWEEN CHANGES IN ACTIVITY PER INTERACTION UNIT AND CHANGES IN E E G
OXYGEN LEVELS BELOW 10.5 %
OXYGEN LEVELS BETWEEN 10.5 & 15.0 %

FIG. 15.

indicate that there is a third factor, namely the activity of the central nervous system as measured by changes in cortical potentials which relates inversely to the change in activity.

In an attempt to determine what other factors could play a rôle in the change of activity during low oxygen, a few experiments were conducted in which changes in the heart rate were measured at various levels of anoxia. These experiments indicated that the individuals whose heart rate was markedly increased during anoxia showed considerable decrease in their activity, whereas the indi-

viduals whose heart rate showed little or no increase during anoxia showed little or no change in their activity. This again would indicate a direct relationship between increase in heart rate, which is an indication of autonomic activity, and a decrease of verbal and gestural activity. Only a few of these experiments have been done to date, and conclusions are necessarily tentative. However, in a previous study(21) it was shown that intramuscular injection of adrenalin caused a decrease in word production which was associated with marked subjective feelings. The present study adds additional weight to the hypothesis that the decrease in verbal and gestural activity is associated with an increase in autonomic activity, resulting in an increased awareness of internal phenomena. This problem is at present being further investigated.

Summary

1. Observations on the effect of breathing low oxygen are reported in a series of 67 patients and 42 controls, in whom changes in central nervous system activity were measured by the EEG and changes in behavior by the interaction chronogram.

2. Most subjects showed a shift in EEG to the slow frequencies during low oxygen. This was more marked and consistent when the CO_2 was less than .3%. There was no difference between patients and controls.

3. A decrease in verbal and gestural activity was found in about three-fourths of the subjects. The decrease was greater for the patients than the controls.

4. Subjects with high initial activity while breathing air showed the greatest decrease as a result of low O_2. Subjects with low activity rates in air showed slight decreases and, in many instances, an increase.

5. Subjects with marked changes in EEG tended to show an increase in activity.

6. Four factors are discussed as playing a rôle in determining the changes in activity due to low O_2.

(a) Initial rate of activity.
(b) Diagnosis.
(c) Electroencephalographic changes.
(d) Autonomic activity as measured by heart rate.

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ELECTROENCEPHALOGRAPHIC PATTERNS FROM THE BASE OF THE BRAIN[1]

MILTON GREENBLATT, M.D., DANIEL FUNKENSTEIN, M.D.,
DANIEL MILLER, M.D., MAX RINKEL, M.D.

Recordings of the electrical activity of the brain are conventionally obtained from electrodes placed in various positions on the scalp. Although disturbances deep within the brain may affect the surface area, our present procedure registers mainly cortical activity(1). With the prevailing technique, the true character of the electrical oscillations of deeper tissue is obscured.

The desirability of new electrode placements has attracted a number of workers. Thus, a cisterna magna lead has been described(2), ventricular electroencephalograms have been obtained from animals and human subjects during ventriculography(3), and electrical activity from leads placed in the posterior pharynx has been studied in animals and man(4, 5, 6, 7, 8, 9). Our work has been concerned with this latter technique.

Material and Methods

A group of 17 cases with varying neuropsychiatric complaints was studied. The patients were either hospitalized in the Boston Psychopathic Hospital or attached to the out-patient clinic. Since our attention was directed mainly toward working out an adequate technique and becoming familiar with a variety of basal patterns, we studied a variety of clinical types. These included patients with convulsive disorders (4 cases), psychopaths and behavior problems (3 cases), dementia præcox (3 cases), patients with gross pathology of the brain (3 cases), manic-depressive psychosis (2 cases), anxiety neurosis (1 case), obsessive-compulsive neurosis (1 case). In this study our attention was particularly directed towards technique, location of electrodes, and characteristics of basal EEGs. We observed the response to light perception, to voluntary hyperventilation, and to injected epinephrine, mecholyl and sodium amytal. In addition we had the opportunity to observe several spontaneous larval slow-wave and petit mal discharges in epileptic patients, and in 2 patients the effect of induced convulsions. Three patients with gross intracranial pathology were studied, of which 2 are briefly mentioned.

Technique

The electrode used by us is a modification of the one described by Grinker and Serota (5). Instead of a sharply pointed insulated metallic rod which is imbedded in the posterior nasopharynx, we used a copper solder electrode 2×6 mm. connected to an insulated telephone wire 2½ mm. in diameter and about 70 cm. long. The first 15 cm. of the telephone wire are stiffened by means of a wooded applicator stick bound in apposition to the telephone wire by ordinary adhesive. The part inserted into the nose is, therefore, about 2½×5 mm. and flexible enough to withstand a moderate degree of bending or moulding to the tissues of the nasal cavity.

The nasopharynx of the patient is first cocainized with 10% cocaine. The cavity is visualized by means of a nasopharyngoscope, then the lead is inserted firmly against the appropriate anatomical part. Usually the electrode maintains itself without additional support. Both nostrils are plugged with cotton wadding to discourage nasal breathing which tends to introduce artefacts. Following the application of the electrode, an X-ray is taken to determine its exact location and distance from the base of the brain. During the recordings, the nasopharyngeal electrode may be readjusted several times; in general, however, it requires little more care than

[1] From the Department of Psychiatry, Harvard Medical School and the Boston Psychopathic Hospital, Boston, Massachusetts.

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electrodes on the scalp. The resistance between the nasopharyngeal lead and a reference point such as the ear lobe is usually around 5000 ohms, which is adequate for good recording.

Upon removal of the electrodes one observes hemaglobin pigment on the contact end. We have had no instances of infection or other serious sequelæ. One patient had a very marked reaction to the cocainization and insertion of the electrode in the form of pallor, tremors, tachycardia and anxiety, with waves of pallor and tachycardia occurring throughout the experiment. Another complained of distressing pain in the nasopharynx after the test. Three or four patients disliked the procedure and would not submit to a retest.

The placement of the electrode within the nasopharyngeal cavity and the subsequent manipulations and readjustments were done by the nose and throat consultant attached to the hospital (D.M.).

All recordings were done with the patient in the sitting position in a dark quiet room. In addition to the nasopharyngeal lead, electrodes were also placed over frontal, motor, temporal and occipital areas. One channel was usually reserved for recording the EKG through electrodes placed on both infraclavicular regions. The EKG was not necessarily standardized for position of electrodes or amplitude, our purpose being simply to follow the cardiac rate and rhythm and gross changes of wave contour. We attached the cardiac electrodes to the upper thorax rather than the arms in order to eliminate movement artefacts coming from the limbs. In interpreting the basal brain activity, it is almost essential to have a simultaneous record of EKG.

All the electrodes recording from the brain (including the nasopharyngeal electrode) are referred to the interconnected ear leads which are grounded, and the preamplifiers are turned to ground. All EEG tracings were standardized by calibration from a standard signal (50 mv) and by matching simultaneous tracings obtained from identical regions of the head.

Location of Electrodes and Terminology

Grinker (4, 5, 6) has used the term "hypothalamic" lead for an electrode imbedded in the posterior pharynx. Hoagland *et al.* (7) more cautiously referred to this pick-up as a "region near the hypothalamus." Jasper (10) believes this nasopharyngeal lead is a very diffuse one to many diencephalic and midbrain structures so that one cannot attribute the activity to any particular area.

X-rays reveal that the posterior nasopharyngeal placement is anterior and inferior to the sphenoid sinus and that the distance from the base of the brain varies primarily with the size of the sphenoid sinus. We term this posterior nasopharyngeal lead the *basal sphenoid lead* (S lead).

We also used a placement more anteriorly and higher up in the nasal cavity in a position corresponding to the spheno-ethmoidal recess. This placement we designate as the *basal spheno-ethmoidal lead* (S-E lead).

The sphenoid lead (S lead) is in the general vicinity of the diencephalic and midbrain structures, postero-inferior frontal cortex and medial temporal cortex. The spheno-ethmoidal lead (S-E lead) is in the general vicinity of the posterior inferior frontal area. A comparison of S lead with S-E lead reveals the following: The S-E lead is more anterior and higher up in the nasal cavity, closer to the base of the brain and, therefore, more localized in its pick-up than the S lead. The S-E lead lies under the posterior end of the cribriform plate. Recordings from the S-E lead are less subject to both cardiac and respiratory artefacts than the S lead. (See X-rays for location of basal lead.)

Characteristics of Basal Electroencephalogram

Fig. 1 shows recordings of brain activity from various scalp and basal leads in 3 different cases. The EKG (unstandardized) is also shown for each patient.

The basal EEG yields a distinctive, characteristic pattern. The pattern is usually of lower voltage than the cortical pattern, less rich in sinusoidal or alpha-type waves, and contains a great deal of irregular activity with random slow waves or baseline sways. In a heterogeneous group of neuropsychiatric cases, we most often found a low voltage irregular pattern with random slow waves. Although the basal tracings show many similarities to tracings obtained from

the cortical (scalp leads) the two are readily differentiated. Activity from the base varies from one individual to another as much as cortical tracings. In some individuals the basal activity shows quite a departure from the characteristics of the cortical rhythms. In other individuals the basal activity reflects most of the dominant characteristics of the cortical rhythm. In many cases the basal activity resembled most the activity obtained from the temporal areas. In epileptic patients, we found, as a rule, much greater amplitude than in the non-epileptic group, with discharges of abnormal frequency activity appearing in both cortical and basal graphs, but not necessarily simultaneously.

The effect of opening the eyes was suppression of the alpha-type activity in favor of low voltage random activity which promptly disappeared when the eyes were closed. In our experience, the basal rhythm behaves in a similar way to the cortical rhythm in response to visual stimulation. The effect of visual stimulation is relatively difficult to demonstrate in basal EEGs because most individuals have shown little alpha activity in recordings from this lead. In this respect, our records are in agreement with those of Hoagland *et al.*(7) but are not in accord with those of Grinker and Serota(5) who report an intensification of alpha activity in the basal lead upon visual stimulation.

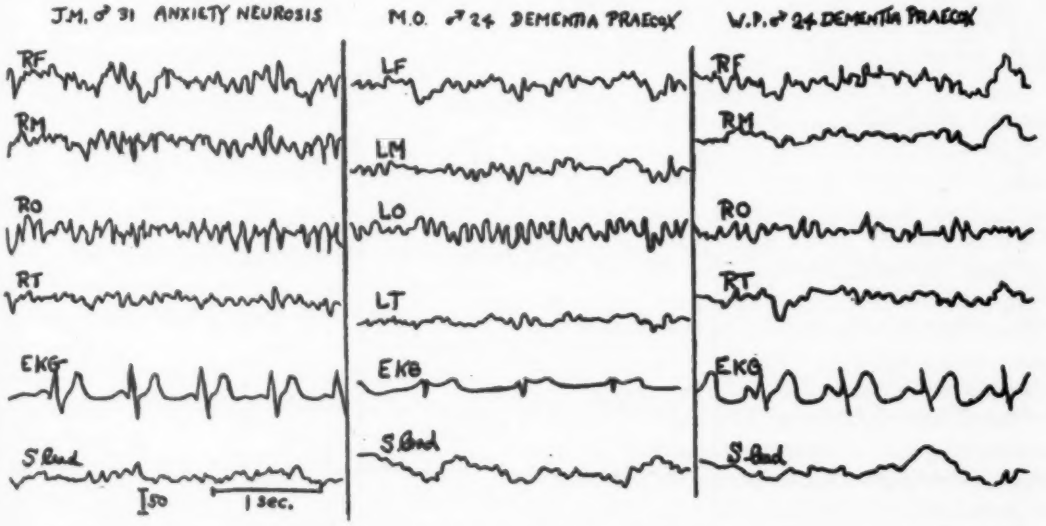

FIG. 1.—Simultaneous cortical leads, basal leads and EKGs on three different patients. The upright line is 50 microvolts. The horizontal line is one second.

J. M., age 31, suffered from anxiety neurosis. The cortical leads showed fairly good quality normal frequency sinusoidal (alpha-type) rhythm. The basal lead is less rich in alpha waves and demonstrates a good deal of low voltage irregular activity.

M. O., age 24, is diagnosed dementia præcox. He showed smooth alpha-type rhythm in the occiput and minor irregularities elsewhere. The S lead demonstrates low voltage alpha-type rhythm with sways secondary to the heart beat.

W. P., age 25, is diagnosed dementia præcox. The basal lead shows an irregular low voltage pattern with tiny spikes synchronous with the QRS complex of the EKG.

The *effects of overbreathing* on the basal and cortical EEGs were compared. In general the two curves tended to parallel each other—that is, a large "build-up" in cortical activity was usually accompanied by a large "build-up" in basal activity. However, the degree of change from the resting pattern was not always the same; there were instances in which the basal pattern showed greater frequency shift and amplitude change than did the cortical pattern and vice versa. Episodic slow-wave discharges appearing in cortical patterns during hyperventilation were usually, but not always, accompanied by similar slow-wave discharges in the basal pattern. In other words, the stress of hyper-

ventilation affected both parts of the brain, but each could respond, to a degree, independently of the other.

Fig. 2 shows basal activity from a lead placed in relation to the sphenoid sinus (S lead) compared with activity from five conventional scalp areas. The patient is a 42-year-old man, who recovered from an attack of manic-depressive psychosis with electric shock treatment. The response to hyperventilation at 40 and 80 breaths is illustrated. High voltage episodes are seen arising from both cortex and base of brain at 40 and 80 deep breaths. In this case the physiological stress imposed by overbreathing evoked similar responses from cortex and base of brain.

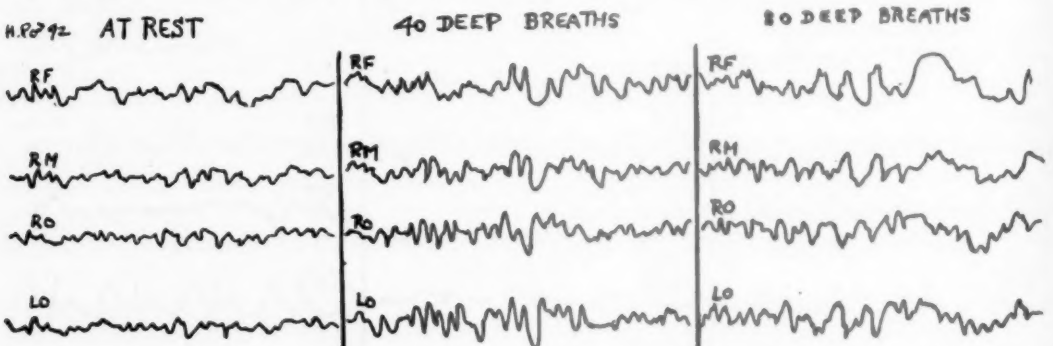

FIG. 2.—Effect of overbreathing on cortical and basal rhythm. A large "build-up" is seen in all leads; the cortex and base appear to respond in a similar manner to the physiological stress of hyperventilation (see text).

PHARMACOLOGICAL STUDIES

The *effect of injected drugs* was studied with the following results:

(a) *Epinephrine* .05 to 0.1 mg. was given intravenously to 6 different patients and the clinical, electroencephalographic, and electrocardiographic response was noted. The basal EEG showed intensification of alpha activity (increase in amount and amplitude) or introduction of 4-7 per second slow-waves. The effect reached its height in 1-2 minutes and subsided rapidly thereafter. The longest discernible response was 8 minutes.

The cortical EEG always showed a lesser change than the basal EEG. Increase in voltage of preexisting alpha-type waves, slight increase in frequency, and introduction of slow waves occurred.

The clinical effects included fear, palpitation, pounding in the head, pallor and cyanosis. The EKG revealed varying degrees of cardiac slowing and extra-systoles. In general, the magnitude of the clinical response paralleled the EEG changes, particularly the changes in the basal pattern. The least marked effects occurred in anxiety neurosis (1 case), schizophrenia (3 cases); the most marked effect in a case of psychopathic personality.

(b) *Sodium amytal* 7½ grains was given intravenously to 2 patients. Fast activity promptly appeared in all leads, 16-24 per second frequency, and of high voltage. The effect reached a maximum in about 5 minutes and subsided gradually up to 15 minutes. In one case, the amplitude was greatest in frontal leads, least in occipital and basal leads. In the other case, the amplitude was greatest in basal and motor needs. During drowsy spells, a great deal of irregular slow activity broke into both cortical and basal patterns.

(c) *Acetylbetamethylcholine* (mecholyl) 10 mg. was given subcutaneously to one case.

Marked flushing, perspiration and quickening of heart rate occurred. A great many irregular low and medium voltage slow waves came in at 1 minute, rose to a maximum at 4-6 minutes and subsided by 15 minutes. The basal tracing showed much greater response than did the cortical tracings

EPILEPTIC PATIENTS

The basal and cortical EEGs of epileptic patients were studied. They were characterized by recurrent episodes of abnormal slow-wave activity of varying severity appearing both at rest and during overbreathing. These were obtained from both superficial and basal leads. In general, the cortical leads showed changes of greater magnitude than the basal leads. The slow-wave episodes were usually but not necessarily synchronized from the 2 areas. During overbreathing large build-ups were obtained from all leads, most marked in cortical (superficial) leads.

Several larval spike and wave discharge were noted. The basal discharge was in one instance almost negligible as compared to the waves in the scalp leads, and in others the discharge from the base appeared distorted or flattened (Fig. 3 at 20 deep breaths). In this case the basal discharge definitely lagged behind that from the cortex (scalp) (Fig. 3).

Induced Seizures.—In two cases, unconsciousness with short tonic-clonic convulsions was induced by compression of the carotid arteries bilaterally. High voltage slow waves, 2-3 per second frequency, appeared from all cortical leads just before and during the seizure. The basal lead demonstrated irregular slow-wave activity 4-7 per second frequency of medium to low voltage.

PATIENTS WITH GROSS PATHOLOGY OF THE BRAIN

Two patients with gross pathology of the brain are briefly reported.

Case 1 was a man of 37, subject to recurrent depressions, the first of which appeared following the accidental discovery of diffuse abnormal calcification at the base of his brain. His admission to the Boston Psychopathic Hospital was occasioned by deepening depression, tension and anxiety. Physical and neurological examinations were negative. Psychometric examination disclosed definitely abnormal psychological performance consistent with brain damage. *E.E.G.* revealed continuous diffuse slow-wave activity of 6-7 per second frequency from all leads. Upon overbreathing, a large build-up appeared diffusely, most marked in the basal lead. Triangulation localization using basal lead with motor and occipital leads for each hemisphere disclosed maximum disturbance deep within the brain (a great deal of phase reversal activity appeared localizing in the deep lead).

Case 2 was a 43-year-old male who noted acute difficulty with object perception some three weeks before admission to the hospital, coupled with nausea, vomiting, and dizziness. 1½ weeks before admission, he suffered from frontal headaches and staggering gait. Examination revealed inconstant left homonymous hemianopia without papilledema or other positive neurological signs. Lumbar puncture showed a total protein of 82 mg.% and increased initial pressure (250 mm. of H_2O). The clinical diagnosis was that of an expanding intracranial lesion of undetermined localization.

On *EEG examination* the patient demonstrated clear-cut asymmetry between the two hemispheres particularly in the occipital aspects. The right occipital rhythm was disorganized, alpha rhythm was suppressed and random low voltage slow waves appeared from this area. No significant abnormality was noted in the recordings from the deep lead. Localization by monopolar and triangulation techniques fixed the disorder in the right occiput. The EEG data indicated right occipital focal pathology without deep spread. This conclusion was verified by operation.

In the first case, the EEG was helpful in (1) establishing diffuse abnormality and (2) localizing the site of maximum abnormality to the base of the brain. In the second case, the EEG was helpful in (1) establishing a cortical focus and (2) demonstrating by means of the deep lead that the disturbance had not spread to the base of the brain.

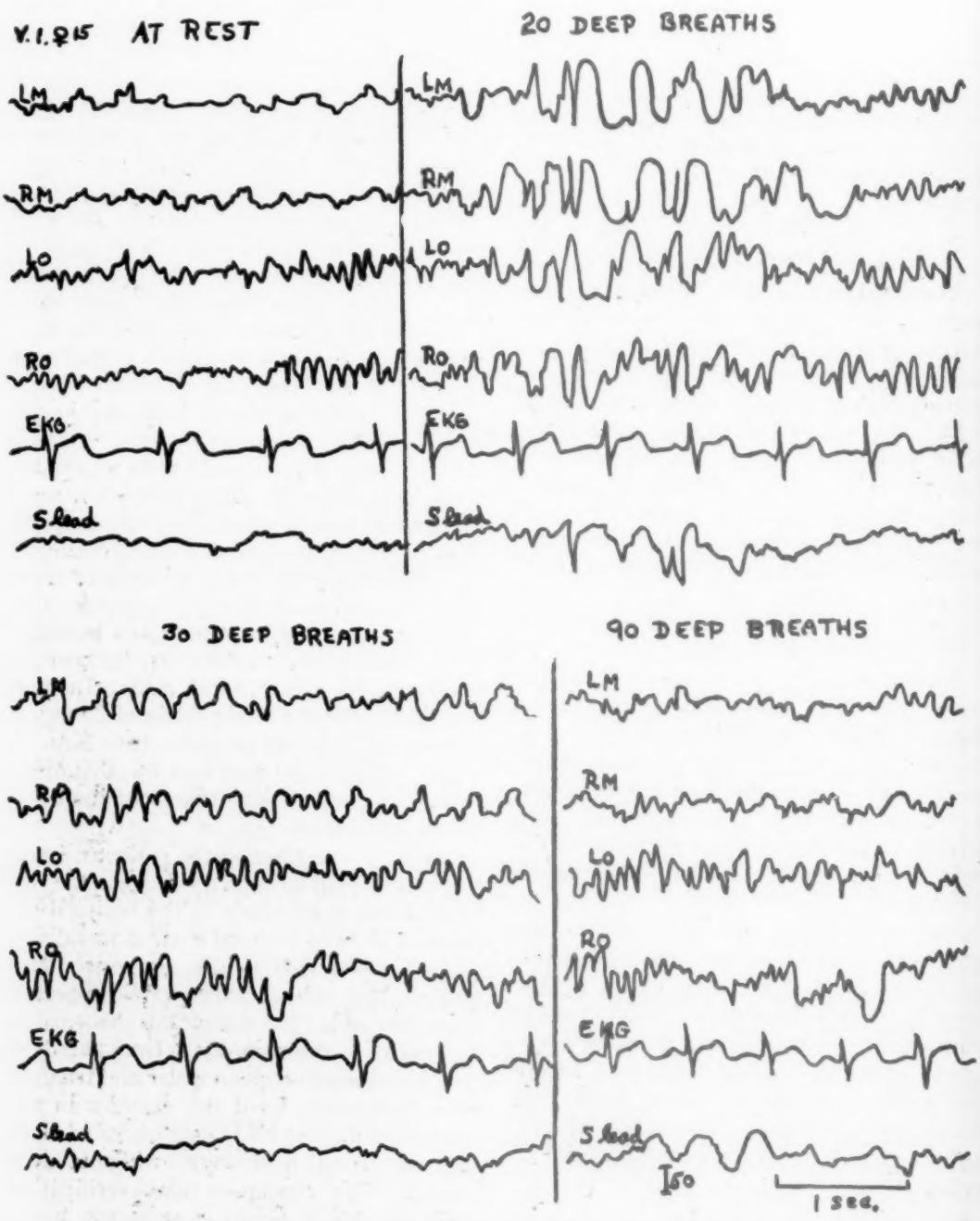

FIG. 3.—Effect of overbreathing on cortical and basal EEG and upon EKG of an epileptic patient. At 20 deep breaths, a clear-cut petit mal outburst appeared from all cortical leads and also from the basal lead. There were no clinical manifestations of petit mal at this time. It is interesting to note that the configuration of the discharge from the basal leads was somewhat different from that of the other leads. The alternate dart and dome (which is closest to the classical form in the motor leads) appears in quite distorted and less emphatic form in the basal lead and appears to be delayed in time of onset when compared to the paroxysms in the cortical leads. Fig. 3 also shows at 30 deep breaths an episode of slow-wave activity of 4-6 per second frequency appearing in both motor leads but not from occipital or basal leads. At 90 deep breaths, slow undulations at 3 per second were noted from the basal lead but not from cortical leads.

FIG. 4.—Lateral view of skull with basal lead *in situ*. The lead is anterior and below the sphenoid sinus (S lead).

The basal lead technique opens up possibilities in the localization of gross pathology at the base of the brain. The sphenoidal lead (S lead) would probably be best in the detection of abnormalities in and around the third ventricle, whereas leads placed more anteriorly, we believe, would be helpful in localization of subfrontal disorders.

ARTEFACTS FROM THE BASAL LEAD

Even a short experience with EEGs from the basal lead convinces one that interpretations must of necessity be conservative because of the frequency of artefacts. Blink and swallowing artefacts, movement artefacts, cardiac and respiratory artefacts are readily recorded from the basal lead. It is our impression that the pulsations from the large vessels of the neck may superimpose oscillations upon the basal record, often obliterating waves from the base of the brain. Cardio-vascular artefacts are easily detected by their regular period and time relation to the pulse, but the wave forms may be so variable that it is necessary to have simultaneous EKGs for proper appraisal of the record. Respiratory artefacts often make satisfactory recording impossible.

DISCUSSION

What part of the brain is recorded from the basal lead? This depends primarily upon the location of the lead, the distance from the brain, and the character of the conducting medium through which the electrical oscillations pass. The farther away the lead is from the base of the brain, the more diffuse is the recording. The distance of the basal sphenoid lead from the base of the brain depends largely on the size of the sphenoid sinus. By actual measurement, the distance of the basal sphenoid lead from the clinoid processes is about 3-4 cm., the distance of a spheno-ethmoidal lead from the orbital surface of the frontal bone is about 1½-3 cm.

As yet, we have no assurances that the basal sphenoid lead records from the hypothalamus. Hoagland(8) reports that the electrical activity of the hypothalamus as recorded from an electrode placed directly in the hypothalamus in dogs is very similar to that obtained in man from a sphenoid lead. However, in the same communication he reports that the activity from the anterior hypothalamus is considerably different from that of the posterior hypothalamus in the same animal although the distance between the electrodes is only a centimeter or so. The proximity of inferior frontal and medial temporal cortex to the basal lead suggests we may be recording from these structures as well as diencephalic tissue. The basal activity appears to us as a variable but complex composite of electrical oscillations from a variety of structures, each lending their share to the final wave picture.

By electrical stimulation directly through the basal lead, Grinker(5) obtained alteration of the basal EEG together with dilated pupils, perspiration, rise in blood pressure, anxiety—a syndrome suggesting involvement of centers integrating autonomic patterns. However, it is possible (as Hoagland has stated) that the hypothalamic centers were secondarily detonated by the electrical stimulus. We have seen similar autonomic discharges without electrical stimulation, simply by cocainization of the nasopharynx and instrumental manipulation about this area.

Although we are ignorant of the precise structures involved in the basal recording or the relative rôle they play in the finally recorded pattern, nevertheless the basal lead gives important information concerning the activity in a remote area and as such becomes an important adjunct in the examination of the nervous system. The basal regions appear to respond to a variety of stimuli in the same general way as does the cortex. We have shown, however, that the magnitude of the response of the two areas may differ and that the activity of one is not dependent on the other.

Jasper(10) reported on one case of epilepsy with basal lead studies showing large slow waves from the base of the brain (but no cortical abnormalities) at the onset of an epileptic attack, when the patient felt he was "sliding towards a spell." Hursh(11) obtained petit mal discharges from the two hemispheres simultaneously despite almost complete section of the corpus collosum and

believes petit mal attacks originate in the thalamus or subthalamus. Ostrow and Ostrow(12) postulate a predominantly subcortical disturbance in all cases of epilepsy. In the epileptic discharges which we observed, spontaneous or induced, the cortical pattern generally showed more pronounced alterations than the basal pattern and in some instances at least the basal pattern lagged behind the cortical patterns. However, relative independence of the two areas was also observed. In schizophrenic patients, Hoagland(7) found that delta surges elicited by emotionally charged verbal stimuli appeared first in recordings from the base, and after a lag of 3-4 sigma were found in recordings from the occiput.

To autonomic stimuli, whether sympathico-mimetic (epinephrine) or parasympathico-mimetic (mecholyl), the changes in the basal activity were much more marked as regards both frequency and voltage than in the cortex. The response to epinephrine, both subjectively and objectively, varied considerably in our six cases. In studies with the hypothalamic lead, Grinker(6) found that a group of schizophrenic patients were less responsive to a variety of stimuli including epinephrine, than non-schizophrenic patients. We obtained our greatest response in a hostile, aggressive psychopath who gave the impression of being "set to explode," and the least response in anxiety neurosis (1 case) and dementia præcox. A marked response was obtained from a manic-depressive patient recently treated with electric shock whose EEG was considerably altered by the treatment. We are inclined to believe that electric shock treatment rendered the patient more reactive to epinephrine.

The value of basal electroencephalographic recordings is shown not only in studies of epileptic discharges and the changes induced by acute pharmacological stresses, but also in the study of gross brain pathology. The localization at the base of the brain can be somewhat refined by shifting the basal lead from one area to another, or inserting two leads in different localizations. We have obtained satisfactory recordings not only from the sub-sphenoid area but also from anterior and posterior subfrontal areas.

Summary

Electroencephalographic recordings from the base of the brain give valuable supplementary information to data obtained from conventional scalp recordings. Various locations of the deep lead are possible—subsphenoid, spheno-ethmoidal or subfrontal.

Several varieties of basal patterns are described and illustrated. The effect of visual stimulation, overbreathing, drugs, spontaneous and induced electrical discharges in epileptics, and of gross intracranial pathology is described.

In general the basal rhythm response to various stimuli is similar to that of the cortical (superficial) rhythm. Visual stimulation flattens the basal rhythm and blocks the alpha activity. Hyperventilation induces a build-up in size of potentials and a slowing of rhythm, which may be greater or less than that of the cortex. Autonomic drugs (epinephrine and mecholyl) appear to affect base more than cortex. Sodium amytal in amounts sufficient to produce intoxication but not sleep, results in high voltage fast waves in base as well as cortex.

Electrical paroxysms typical of epilepsy usually are more pronounced at the cortex than at the base.

The basal lead is a valuable adjunct in localization of gross intracranial pathology.

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A STUDY OF THE MINNESOTA MULTIPHASIC PERSONALITY INVENTORY IN CLINICAL PRACTICE

WITH NOTES ON THE CORNELL INDEX [1]

HERBERT C. MODLIN, CAPT., M. C.

Because of its intricate subjectivity, psychiatry has until recently been able to lean only restrictedly on objective laboratory aids long essential to clinical medicine generally. For this reason, those conversant with the intangibilities of psyche and soma have eagerly explored potentialities in the psychometric testing of personality components.

Revolutionary psychiatric requirements of World War II stimulated and gave marked impetus to inquiry regarding this relatively new instrument; for the screening, evaluation, reassignment and disposition of large masses of men within the military organization could not be accomplished through the individual handling traditional in clinical practice. Numerous valuable testing methods have been devised, and as Dr. Karl Menninger has stated(17), "the practice of psychiatry without the assistance of modern psychological testing is as old fashioned and out of date as would be the practice of orthopedics without the x-ray."

Among the most ambitious attempts to objectify the data of clinical psychiatry is the Multiphasic Personality Inventory developed by Hathaway and McKinley at the University of Minnesota. In a series of publications (6, 7, 8, 13, 14, 15, 16,) they have described in detail the compilation and validation of the test using manifold clinical media and types of controls. The test has been widely introduced to the Armed Forces, where it has been experimentally utilized in a wealth of case material, and it is receiving mention in neuropsychiatric literature with increasing frequency.

The test consists of 550 statements, each printed separately on a small card. The patient is requested to read each statement, and then to place the card under one of three headings, "true," "false," or " cannot say" accordingly as the statement applies to him personally. Some statements are couched in positive terms, some negative, and some are of no scorable significance. The responses are scored and the results recorded in 9 clinical diagnostic categories; namely, hypochondriasis (Hs), depression (D), hysteria (Hy) psychopathic deviate (Pd), masculine-feminine traits (Mf), paranoia (Pa), psychasthenia (Pt), schizophrenia (Sc), and hypomania (Ma).

The results of each individual test are reported in 12 separate categories. There are, in addition to the 9 above mentioned, 3 categories which serve as checks on the validity of the test. The "cannot say" answers are counted and scored to form an index of indecisiveness or carelessness; 15 very obvious, straightforward statements are scored as "lie" responses (L score); 64 miscellaneous, otherwise unscored statements are used as an index of random answers, carelessness, or possible clerical errors (F score or validity score). The raw scores for all the 12 scales are changed quantitatively to a standard score in which 60 is doubtful and 70 or over is probably pathological.

The purpose of the Minnesota Multiphasic Personality Inventory (hereafter M. Inventory) is to define the more important clinical phases of personality. This is accomplished by evaluation both of the symptoms and of the underlying personality structure. Some statements such as, "My mouth feels dry almost all the time," and "Much of the time my head seems to hurt all over," are strictly symptomatic, while others inquire into attitudes toward parents, society, sex, etc. Such valuable features as are characterized by Murray's personality delineations(19) and symptom catalogues of the Cornell Indices (24, 25) are combined in the test.

Indications for conducting the investigation reported here were several: First, a more extensive study of the individual appli-

[1] From the neuropsychiatric section of the medical service, A. A. F. Regional Hospital, Keesler Field, Mississippi.

cation of the M. Inventory is necessary. Most of the statistical material of the authors and others is concerned with group comparisons rather than individual test results. That 25 hypochondriacs make an average score of 74.2 on the hypochondriasis (Hs) scale(13) is interesting information; but it is desirable to enumerate those individuals making normal scores below the critical level of 70, those making significantly high scores on some of the remaining 8 scales, and those patients in other diagnostic categories also making high scores on the Hs scale. The clinician does not see patients in pre-classified groups, and must be able to interpret individually the results on each M. Inventory record.

Second, the M. Inventory has not previously been applied to the largest single group of psychiatric disorders, the anxiety neuroses. There is no scale in the M. Inventory for anxiety, and none of the papers published by the authors or others have signified that research relative to this obvious defect has been undertaken. Clinical use of the test will be seriously limited if all patients with anxiety are to be ignored. The authors do state(8) that additional scales will be constructed from time to time from the original 550 questions, but it is doubtful that a satisfactory scale for measuring anxiety could be framed on the same basis as were the 9 now in use. The peculiar affective drive termed anxiety permeates most psychiatric reactions, and is particularly prominent in all the subdivisions of neurosis. It is indeed possible that a scorable scale of characteristic statements discretely defining a pure anxiety type of personality could not be separated from the multiple symptomatological expressions of anxiety.

Third, it appears expedient to validate the authors' results. They state that several of their scales are only tentative because insufficient cases were used in forming them. It is advisable, if the test is to be of protean application, to evaluate it under conditions dissimilar to those under which the authors judged it(9).

Fourth, extension of the M. Inventory to all medical problems in which personality equations and functional factors figure, is desirable. Ruesch and Bowman(16) have employed the test for evaluating post-traumatic headache; Abramson(2, 3) has applied it to minor deviations in "normal" officer personnel and to normal persons after ingestion of alcohol; Michael and Buhler(18) have tried it in 90 difficult diagnostic problems. The large numbers of enuretics, epileptics, alcoholics, somnambulists, migraine sufferers, etc., in the series reported here suggested excellent material for attempting to widen the scope of usefulness of the M. Inventory.

Fifth, the possibility of repeating the test at intervals to measure progress of a patient under treatment or to aid in prognosis should be investigated. Whether or not such a retest would be valid has not been studied to date.

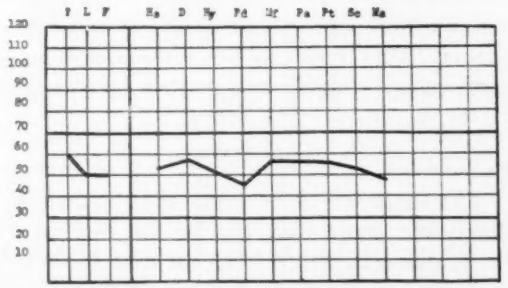

FIG. 1.—Minnesota multiphasic personality inventory profile chart.

This profile is taken from the Minnesota Multiphasic Personality Inventory, published by the University of Minnesota Press. The production of the test is now in the hands of the Psychological Corporation.

PATIENT MATERIAL

The M. Inventory records in this report were obtained from 500 United States Army enlisted personnel. One hundred controls were chosen whose age and duty assignments were comparable to those of the 400 patients. The only specifications for inclusion of a man in the control series were that he be performing adequately in his military assignment and at the time be receiving no form of medical treatment. Of the 400 patients tested, results for 84 were discarded because of incompleteness, a doubtful diagnosis, or technical error; consequently, the findings are based on the scores of 316 testees.

Entirely normal records were obtained from 78 of the 100 control subjects; *i. e.*, all 9 diagnostic scores were below 70. A sample normal profile is shown in Fig. 1.

Each of the remaining 22 records, contained at least one score of 70. Twelve had only one score over 69, six had two scores over 69, three had three scores over 69, and one had four scores over 69. The abnormalities present were not marked since 13 were borderline (between 70 and 73), and only 4 of the 22 had a score over 76. The 10 patients making two or more high scores were interviewed, and definite evidence of anxiety was found in each. Since the intention was not to discover 100 normal Minnesota records, but to differentiate between 100 non-complaining soldiers and a group voicing symptoms; the 22 mildly abnormal records were retained in the control group. Separate studies of the 78 normal and of the 22 abnormal records revealed no significant qualitative differences. Hysteria (Hy) and hypomania (Ma) received the highest scores in each group, roughly in the same percentages.

Diagnosis

The authors state that the identifying diagnostic score may not be the highest of the 9 made by the testee, but that it should rank among the highest three or four. The statistics presented here will illustrate complete agreement with that observation, particularly as applied to individual records rather than to group studies. Chart I, with the diagnostic categories comprising the ordinate, and the abscissa marked in percentages, graphically represents the potential value as a diagnostic aid of the four highest scores in an M. Inventory record. Only 20% of the records scored highest in hypochondriasis (Hs) (first column), but 100% had Hs as one of the four highest scores. Pd was the highest score on the record in only 14% of the psychopathic deviations. Among the four highest scores, however, Pd occurred in 86% of the records.

M. Inventory results for the 100 controls and 7 of the 9 patient categories appear in Table I. Paranoia and hypomania are not represented in the 316 patients reported here. All figures are percentages. In the hysteria column, for example, 54% of the 15 records showed hysteria (Hy) the highest of the 9 scores, 18% scored highest in depression (D), 18% were highest in hypochondriasis (Hs), and 9% were highest in psychasthenia (Pt). In comparison the lower half of the Hy column shows that 91% of the records included Hy among the first four scores, and

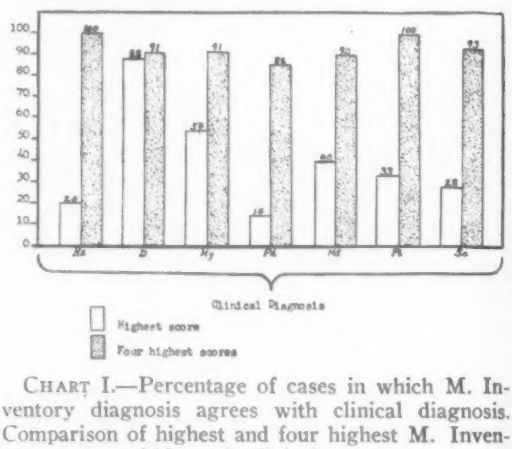

Chart I.—Percentage of cases in which M. Inventory diagnosis agrees with clinical diagnosis. Comparison of highest and four highest M. Inventory scores within each clinical category.

TABLE I

Comparison in Each Clinical Diagnostic Category Between the Highest and the Four Highest Scores on the M. Inventory

	Controls	Clinical diagnostic categories						
		Hs	D	Hy	Pd	Mf	Pt	Sc
Number of cases.....	100	10	31	15	28	10	6	17
Highest score M. Inventory	Hy	D	D	Hy	D	Mf	Pt	Sc
	27	60	88	54	50	40	33	28
	Ma	Hs	Hy	D	Pd	D	D	D
	25	20	6	18	14	30	33	28
	D	Hy	Sc	Hs	Sc	Hy	Hs	Hy
	11	20	6	18	14	20	17	21
	Pd	..	..	Pt	Hs	Pt	Sc	Pd
	9	..	..	9	7	20	17	14
Four highest scores M. Inventory	Hy	Hs	D	Hy	Pd	Mf	Pt	Sc
	73	100	97	91	86	90	100	93
	D	D	Hs	D	D	D	D	D
	59	80	71	91	72	80	84	79
	Ma	Pt	Pt	Hs	Sc	Hy	Sc	Pt
	57	80	58	82	57	50	57	64
	Hs	Hy	Sc	Mf	Hs	Hs	Hs	Hs
	43	80	58	45	50	50	50	57

All M. Inventory figures are percentages.

91% included D among the first four. The clinical diagnosis of the 117 patients detailed in Table I was discovered among the highest four scores in 92% of the records.

Depression was most successfully verified by the M. Inventory, inasmuch as 88% of 31 clinically classified depressives scored highest on the D scale. It is not surprising

that a subjective tool such as the M. Inventory should accurately define an exquisitely subjective experience like depression. The success of the test in mirroring affective depression is exemplified by the high D scoring on test results for hypochondriasis, hysteria, and several other categories.

In this connection, the inadvisability of utilizing the M. Inventory as a substitute for clinical psychiatric knowledge in making diagnoses should be emphasized. Hathaway and McKinley do not state such an aim for their test, yet it has been criticized for failing to coincide with the clinical diagnosis (5, 18). D was the highest score attained by 161 (51%) of the total 316 cases; however, only 31 (10%) of the patients were clinically diagnosed neurotic depressives. It follows

TABLE II

PERCENTAGE OF PATIENTS SCORING 70 OR OVER ON THE APPROPRIATE M. INVENTORY SCALE. COMPARISON OF 3 STUDIES

Investigator	M. Inventory Scale Hs	D
Hathaway and McKinley	76	68
Leverenz	96	93
Present study	100	97

All figures are percentages.

that of every 100 patients scoring highest on the D scale only 20 will be primary depressives. Similar results were observed relative to hypochondriasis (Hs), hysteria (Hy), psychasthenia (Pt), and schizophrenia (Sc). Twenty-two (8%) records were scored highest on the Sc scale; notwithstanding only 17 (5%) were schizophrenic by clinical definition.

Hathaway and McKinley obtained an over-all correlation of 60% between clinical diagnosis and M. Inventory diagnosis. The 76% correlation in Table I can be explained by a lower incidence of normal records in this survey; that is to say, the proportion of the patients being studied that were subject to correlative scrutiny was increased.

Table II compares results reported by Hathaway and McKinley (7, 13), by Leverenz (12), and by this investigator. The first group of testees consisted of civilians, and the two latter groups of military personnel. The appreciably higher percentage of abnormal records among the service men might be attributable to the acute stresses of military environment under which the tests were taken.

ANXIETY NEUROSES

The application of the M. Inventory to the anxiety states proved to be the most stimulating aspect of this study. Although the M. Inventory does not record anxiety *per se*, it implies some anxiety by measuring several abnormal defenses against it, such as hysteria

TABLE III

ANXIETY NEUROSES

COMPARISON IN EACH DIAGNOSTIC SUBGROUP BETWEEN THE HIGHEST AND FOUR HIGHEST SCORES OF THE M. INVENTORY

	Controls	Diagnostic subgroups: Free anxiety	Combat anxiety	Neurasthenia	Gastric fixation	Headache	Total
Number of cases	100	54	28	6	9	9	122
Highest score M. Inventory	Hy	D	D	D	D	D	D
	27	40	43	33	45	45	49
	Ma	Hs	Hs	Hy	Hs	Hs	Hs
	25	29	14	33	45	22	21
	D	Hy	Hy	Hs	Hy	Hy	Hy
	11	15	14	17	10	11	15
	Pd	Pt	Pt	Ma	..	Sc	Pt
	9	6	7	17	..	11	5
Four highest scores M. Inventory	Hy	D	D	D	D	D	D
	73	90	81	83	79	79	86
	D	Hs	Pt	Hs	Hs	Hs	Hs
	59	90	70	83	68	56	86
	Ma	Hy	Hs	Hy	Hy	Hy	Hy
	57	70	67	83	44	56	63
	Hs	Sc	Sc	Pt	Pt	Pt	Pt
	43	60	53	33	33	44	51

All M. Inventory figures are percentages.

and psychasthenia. As shown in Table III, 122 patients were classified anxiety neuroses and subdivided for statistical analysis under five headings. The 54 "free" anxiety patients exhibited predominantly autonomic symptoms such as palpitation, dyspnea, dizziness, hyperhydrosis, tension and insomnia, and lacked more fixed somatization. The 28 post-combat anxiety states suffered anxiety, tension, irritability and autonomic instability which began during combat and which persisted to a disabling degree for at least four months after the last combat experience.

The neurasthenics were carefully chosen as conforming to the classical picture, with fatigue predominant. The groups with headache and with gastrointestinal fixation experienced sufficient anxiety and tension to exclude them from hysteria, early schizophrenia, or other clinically diagnosed categories. The remaining 16 of the 122 patients presented pictures, one or two patients to each, of neurocirculatory asthenia, arthritic pains, enuresis, alcoholism, etc.

This breakdown, as revealed in the test score percentages of Table III, disclosed a remarkable similarity in most of the subgroups. D was most frequently the high score in all the columns, and Hs was second except in the neurasthenia column. Hy was usually third highest. Both quantitatively and qualitatively results for most of the subgroups closely corresponded to total results for the anxiety group, and the M. Inventory substantiated clinical judgment which grouped these several symptomatic variants under the single heading of anxiety neuroses.

N, P, A, and Av Scores

The fact that the M. Inventory record is composed of 9 separate scores suggests manipulating and combining them in various ways. Of the possible combinations, two have been found eminently practicable. Hathaway and McKinley noted that high scores on the first three of the M. Inventory categories, Hs, D, and Hy, are often concurrent in the neuroses. Ruesch and Bowman, in their post-traumatic studies, totaled these three scores to make a neurotic (N) score. The latter also totaled the paranoid (Pa), psychasthenic (Pt), and schizophrenic (Sc) scores to obtain a psychotic (P) score, and found noteworthy clinical differentiations between groups of patients with high N and P scores.

Although it might be a splitting of nosologic hairs so to speak, the term neurotic score (N) for this total of Hs, D, and Hy would seem not completely applicable. Many neurotics (conversion hysterias, psychasthenics, and neurasthenics) do not produce high N scores while some schizophrenics and psychopaths do. This study of anxiety neurosis (Table III) identifies the highest score as Hs, D, or Hy in 85% of the records.

Although anxiety is generally accepted as common to all neuroses, it is an integrant of many other reactions such as early schizophrenia as well. It is hypothesized that compositely hypochondriasis, depression and hysteria in the M. Inventory measure anxiety, and the combined score of these three categories will hereafter be called the anxiety score (A score).

The average score of the 9 scales will be designated the Av score. Interpretation of the individual M. Inventory record is not measurably facilitated by utilizing this mean since it is less selective than assays already discussed; but if abnormal, *i. e.*, 70 or above, it unexceptionally signifies major pathology spread among several scales. By computing the Av score alone, the M. Inventory might be employed as a screening questionnaire or psychosomatic index. Numerous such interview procedures were applied in military neuropsychiatric examinations during the war with varying reports of satisfaction.

Cornell Index

Among the more successful of these psychosomatic inventories is the Cornell Index (24, 25). Composed of 92 questions, it can be administered in ten minutes and scored in one, and thus it is markedly time saving. The 92 inquiries concerning fears, inadequacy, moods, psychosomatic symptoms, sensitivity and psychopathic traits are printed on one sheet with "Yes—No" opposite each. The testee simply circles the appropriate response. Each question has a value of one. Scores of 0-12 are normal, 13-22 mildly abnormal, 23 or above moderately severe or severe. The aim of the test is to detect individuals with serious personality problems, not to attempt a diagnosis.

In conducting a comparative study, 126 miscellaneous cases were tested by the M. Inventory and the Cornell Service Index (C.S.I.). The number of patients to each clinical diagnosis was as follows:

4	Hypochondriasis
6	Psychasthenia
20	Depression
8	Hysteria
54	Anxiety
6	Schizophrenia
2	Hypomania
2	Migraine

2 Alcoholism
6 Psychopathic deviate
6 Enuresis
10 Epilepsy

The Av score, the A score, and the number of scores over 70 of the M. Inventory (70 score) were selected as results adaptable to a comparison with the score of the C.S.I. For collation with the C.S.I. divisions of normal, mild and severe, the Av and A scores were evaluated to make below 60 normal, 60-69 mild, and 70 or over severe. For parallelism in interpreting the 70 score, 0 was considered normal, 1-2 mild, and 3 or more severe.

Table IV gives the percentages of agreement and disagreement between the patients' records from the two tests. The degree of pathology, when it differed, was greater or lesser by one division in all but 3 of the 126 cases; *e. g.*, an evaluation of mild according to the M. Inventory record might be according to the C.S.I. either normal or severe, and vice versa. The three exceptions were neurotics who were adjudged severe by the C.S.I. but normal by the Av scoring of the M. Inventory. Misleadingly normal scores from both tests occurred in the same types of patients (hysteria, enuresis, migraine). These data indicate that the two psychometric techniques probe similar personality factors; it should therefore be unnecessary to subject the patient to both.

TABLE IV

COMPARISON OF DEGREE OF SEVERITY IN PERSONALITY IMPAIRMENT SHOWN BY C.S.I. AND M. INVENTORY TEST RESULTS ON THE SAME PATIENTS (126 CASES)

	Degree of severity	Percentage of cases
Av score and C. S. I.	Same	64.6
	Av greater	10.7
	Av lesser	24.7
70 score and C. S. I.	Same	74.0
	70 greater	16.9
	70 lesser	9.1
A score and C. S. I.	Same	71.4
	A greater	15.9
	A lesser	12.7

The 92 questions of the C.S.I., desirably frugal of time, and the 550 of the M. Inventory appear to be similarly accurate in discovering psychopathological material. In the evaluation of a single patient, however, when no need exists for screening methods, the Cornell score contributes negligibly to the clinical history; whereas the personality profile of the M. Inventory supplements it constructively.

CURVE PATTERNS

The 9 diagnostic categories have been so organized that the transference neuroses come first, psychoses, including rigid psychasthenia, last, and the psychopathic, homosexual and paranoid reaction types in the middle group. Under this arrangement certain characteristic patterns are formed when the scores of the 9 scales are charted and joined by a continuous line. Some curve patterns thus produced did not yield noteworthy correlations with any clinical picture, and some were too few in number to allow of conclusions, but those illustrated in Fig. 2 have proved useful. In analyzing the *individual* M. Inventory score sheet these curves supplant the N and P scores which are laborious to compute, and which are of chief value in statistical estimation of *groups* of patients.

The type 2 curve is representative of anxiety neurosis, neurotic depression and hypochondriasis. It rarely appears otherwise, and is associated with a high A score. Curve 3 also chiefly typifies neuroses, but this pattern characterized 6 of the 17 early schizophrenics too. An anxiety component in incipient schizophrenic reactions is not uncommon. Because it sensitively depicts anxiety, the M. Inventory's functioning to distinguish early psychoses from neuroses is limited.

In the neuroses a type 3 curve usually denotes a longer standing, more incapacitating reaction than a 2 curve. The secondary elevation on the schizophrenic scale was puzzling until the questions which make up the score on this scale were analyzed. It was ascertained that neurotics answer in a scorable direction, statements related to confusion, concentration, memory defect, worry and depression. The schizophrenic rise in these cases does not spring from questions on seclusiveness, withdrawal, hallucinations or delusions.

The type 4 curve which is of superior diagnostic value, unfortunately prevails in only a small number of cases. It is identified mainly in conversion hysteria, psychopathic deviation, homosexuality and some simple

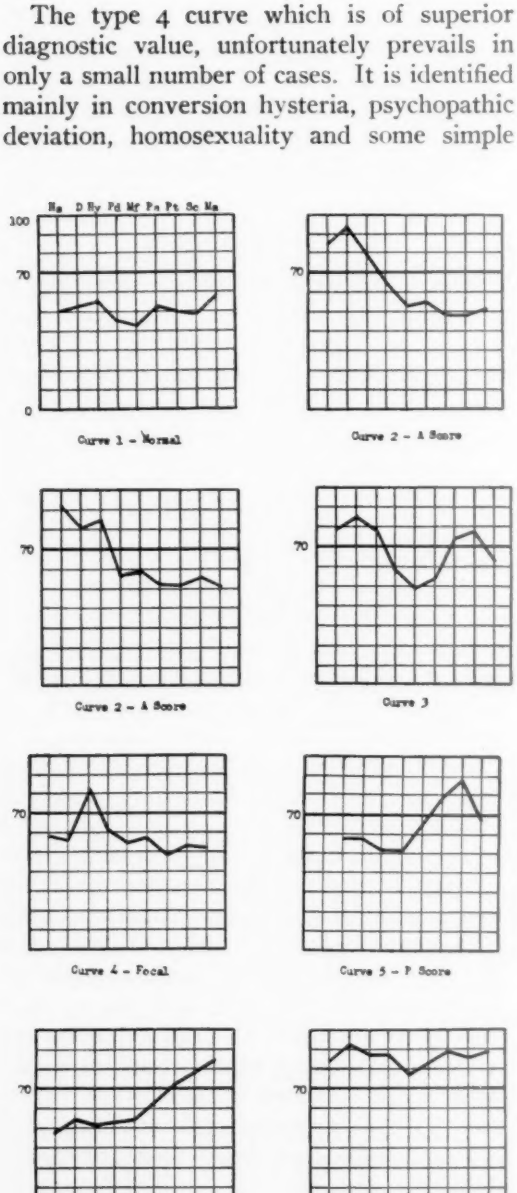

FIG. 2.—M. Inventory curve types.

depressions. It does not appear in the records of patients suffering primarily from anxiety. Curve 5, compatible with an elevated P score, is undoubtedly valuable, when it occurs, in indicating a psychotic reaction; but in early psychotic patients who are sufficiently in contact with reality to produce a valid test, anxiety or depression are so general that curve 3 usually results. The type 6 curve is found most often in mixed cases in which diagnosis is difficult and controversial. Therefore it offers little aid in arriving at a definitive conclusion, but it does reflect the clinical problem.

NORMAL RESPONSES

In evaluating M. Inventory results, certain quantitative measurements must be considered along with the qualitative comparison of relative scores of the nine diagnostic categories and category groups. Table V

TABLE V

COMPARATIVE PERCENTAGES OF NORMAL RESPONSES ON THE M. INVENTORY IN EIGHT CLINICAL DIAGNOSTIC GROUPS

		Clinical diagnostic groups							
	Controls	Anxiety neurosis	Hs	D	Hy	Pd	Mf	Pt	Sc
Number of cases ...	100	122	10	31	15	28	10	6	17
% normal records .	78	6	0	0	27	0	30	0	0

shows the percentage of normal records for the groups thus far discussed. In a normal record all scores are under 70. Abnormal records, therefore, may have from only one to all 9 scores of 70 or over. For the 316 patients, the average number of abnormal scores per record (70 score) was 5.66.

A close correlation with clinical expectations is seen in most of the categories. As evidence of the efficiency with which the M. Inventory detects depression and anxiety, no normal records were found in hypochondriasis, depression, psychasthenia, psychopathic deviation or schizophrenia cases. Those illnesses in which anxiety is most successfully converted, hysteria and neurasthenia, showed a substantial number of normal records, 27% and 33% respectively. In the anxiety subgroups, in addition to neurasthenia, the post-combat anxieties showed fewer abnormal records, probably due to the fact that these were not true character neuroses but, rather, affective prolongations of situational difficulties. In assessing a single M. Inventory record a normal result in patients with Hs, D, Pt, Pd, or Sc would cast doubt on the diagnosis. An abnormal record in cases of hysteria or neurasthenia would

strongly verify the clinical impression, while a normal test result would neither affirm nor deny the diagnosis.

Patients who present a clinical picture of a definite neurosis, but who attain a normal M. Inventory record, may be assumed to have adjusted their neurosis to their environment with a minimal degree of residual anxiety or depression. Their normal scores, far from being misleading, are an important segment of the clinical whole.

Retests—Progress and Prognosis

An exceedingly worth while instrument for objectively measuring the progress of a

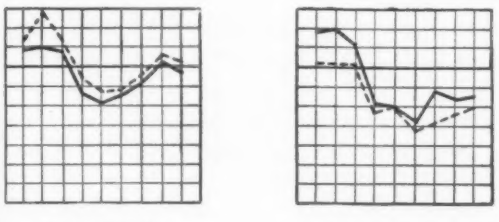

Fig. 3.—Progress of illness—M. Inventory retest.

patient's illness has been realized in the M. Inventory. It correlates almost exactly with clinical calculations in this respect. In Fig. 3 are shown two descriptive cases. The heavy lines represent the first M. Inventory results, and the dotted lines show retest results three weeks later. The amazing parallelism of original and retest curve patterns, although at different quantitative levels, increases confidence in the validity of the results.

In the first case in Fig. 3 the clinical course was downhill with deepening depression and restlessness; and prolonged hospitalization resulted. The other portion of Fig. 3 represents partial resolution of anxiety under psychotherapy. On 17 cases thus retested, improvement or increased illness as shown by the M. Inventory corresponded in every instance with the clinical appraisal.

The M. Inventory has also proved a useful tool in estimating prognoses of acute psychotic patients. Of six acute psychotic reaction cases, too ill on admission to take the test, two were destructive, one was a retarded depression, and three had regressed to a mute, negativistic state. All were notably improved within two weeks, and, due to the manpower shortage occasioned by the breakthrough at Aachen, their prompt return to duty was expedient. They were tested by the M. Inventory, five making normal records and the sixth scoring 76 for Hy and 71 for D but insisting that he felt very well. All returned to military duty under psychiatric observation for about three months while they completed basic training and other assignments. The five whose test results were normal experienced no further trouble and maintained acceptable duty performance; but the sixth became tense after a month at duty, was rehospitalized in a mildly confused state, and was ultimately returned to civilian life.

Borderlands

The application of the M. Inventory to various illnesses with functional components (alcoholism, migraine, post-traumatic headache, epilepsy, enuresis, somnambulism) is shown in Table VI. This tabulation fails to demonstrate a few pertinent details. In chronic alcoholics, for example, there were two competely normal records, three frankly neurotic records (curve 2), one homosexual record (curve 4), three with a high Pd score, two with a high Ma score, and one with a mixed score. Forty-one percent of the migraine patients had non-neurotic, normal records, and 57% had a high anxiety score, illustrating the diverse features of this syndrome.

In the cases of post-traumatic headache, clinical and psychometric results of other investigators of this type of patient were supported (1, 20, 21). Six cases with a history of severe injury produced two normal records and two with a high P score (type 5 curve). Nine minor head injury cases, with no normal records, had uniformly high A scores suggesting functional disorder. Among the epileptics only 13% had normal records; a majority (66%) evidenced anxiety or depression by a type 2 curve; and 42% also had a P score over 70, due chiefly to high scoring on the schizophrenic questions concerning confusion, concentration and withdrawal. Of the habit reactions,

enuresis and somnambulism, 63% and 60% respectively showed normal records. A few cases within this psychosomatic grouping were symptomatic of neuroses, and the M. Inventory indicated this etiology by type 2 and 3 curves.

TABLE VI

M. Inventory Results in Various Psychosomatic Problems.

(1) comparison of highest score with four highest scores. (2) normal records.

		Clinical diagnostic groups					
	Controls	Migraine	Post-traumatic headache	Alcoholism	Epilepsy	Enuresis	Somnambulism
Number of cases	100	12	17	12	22	22	5
(1) Highest score M. Inventory	Hy 27	Hs 58	D 44	Sc 17	D 67	D 37	D 20
	Ma 24	D 26	Hs 38	Ma 17	Sc 13	Hy 27	Ma 20
	D 11	Hy 16	Sc 12	Pd 17	Hy 7	Pt 27	Mf 20
	Pd 9	.. ..	Pd 6	D 17	Pd 7	Pa 9	Pd 20
Four highest scores M. Inventory	Hy 73	Hs 100	D 87	Sc 83	D 93	D 91	Ma 80
	D 59	Hy 100	Hs 87	Pt 75	Hs 67	Hs 72	Hy 60
	Ma 57	D 86	Pt 56	Pd 58	Pt 67	Hy 72	Pt 60
	Hs 43	Sc 43	Hy 50	D 58	Sc 46	Sc 45	Pd 40
(2) % normal records	78	41	6	17	13	63	60

All M. Inventory figures are percentages.

With respect to epilepsy particularly, M. Inventory records emphasized the presence of emotional reaction. All 22 cases had abnormal EEG's and a convincing clinical history of organic illness; yet M. Inventory results revealed 87% emotionally maladjusted, and the desirability of psychotherapy was unmistakably suggested.

Discussion

Utilitarian aspects of psychometry became forcefully apparent during the war as adequate handling of masses of men was immeasurably expedited by testing devices. The salvage value for civilian psychiatry of these tests, however, is not proportionate. It is hardly to be anticipated that screening methods which sifted out a high number of psychopathological service problems will, without alteration, suit the needs of the clinical psychiatrist confronted with a single nervous patient.

Under some existing situations, relatively large groups of potential or actual psychiatric cases may be advantageously surveyed *in toto* (large, understaffed clinics, veterans' hospitals, industrial plants); but personal and individual relationships are inherent in the practice of psychiatry, and psychometric procedures profitable to the clinician must be adaptable to individual application and interpretation.

In this connection the M. Inventory excels most measuring tools of its type. As stated before, if the test is not erroneously employed as an exact diagnostic delineator, but is interpreted as only one part of the psychiatric investigation, it can be a practical adjunct to clinical decisions. With the chief features of the clinical mosaic in mind, the psychiatrist can utilize in the M. Inventory the several highest scores, the curve patterns, the quantitative scores including normal responses, and retest comparisons to obtain additional relevant data, thus broadening his view of the personality problem.

The M. Inventory is a personality schedule by definition of Hathaway and McKinley, not a substitute for clinical diagnosis. In fact, the more successful the M. Inventory is in its avowed purpose of defining personality structure, the less utilizable it becomes as an absolute diagnostic tool. Its inability to accomplish single, accurate diagnoses in a high percentage of cases has evoked a certain degree of criticism which is not surprising, since the results are scored entirely in diagnostic terms, and since the authors themselves in time became concerned with the diagnostic acumen of the test(8).

But why dwell upon one clear-cut diagnosis? No one should be more preoccupied than the psychiatrist with total personality organization and reaction. No one should decry more vigorously than the psychiatrist unimaginative attempts to catalogue sick personalities conveniently in an arbitrary nos-

ology. How much more important that the psychiatrist recognize the anxiety element in early schizophrenia, the depressive affect in a psychopathic personality, the hypochondriacal trends in psychasthenia!

It is precisely the M. Inventory's faculty for displaying multiplex surfaces of the disturbed personality, which fosters confidence in its validity, and increases its effectiveness beyond that of a testing tool yielding a single result only. The M. Inventory requires interpretation, as do most separate laboratory procedures, in the light of the clinical picture. It is not a substitute for the psychiatrist; it is, rather, implicit in his total clinical fact findings; for "in the evaluation of any case we must go beyond the limited objective judgment of the test and obtain an evaluation of the total situation involved. For such purposes there is no substitute for the human mind. A test cannot think but a clinical psychologist can." (Hunt, 10.)

Internists and surgeons have been encouraged to employ the M. Inventory for determining psychoneurotic and psychosomatic symptomatology in their patients(16). For the practitioner inexperienced in mental pathology to expect the M. Inventory to serve as an alternate for psychiatric consultation, would constitute over-estimation of the test's capacity and misunderstanding of its aim. Without the auxiliary knowledge of a qualified psychometrist or psychiatrist in interpreting the results, the uninitiated physician would indeed be disconcerted upon discovering (Table I) that 51% of psychiatric patients score highest on the D scale; that 21% of schizophrenics score highest on the Hy scale; or that only 14% of psychopathic personalities score highest on the Pd scale.

The M. Inventory, provided that it be properly interpreted by an expert, might be considered a candidate to fulfill the urgent need for a reliable psychiatric evaluative procedure in routine use on medical and surgical wards. A large percentage of current diagnostic errors with resultant ineffectual therapeusis can be ascribed to the organically oriented doctor's incomprehension of neurotic, psychotic and psychosomatic diseases. The magnitude and ubiquity of this intraprofessional insularity has been exposed recently by Bennett(4) who found that his 150 frankly neurotic or psychotic patients had, prior to recognition of the true nature of their illness, been subjected to a total of 811 non-psychiatric therapeutic measures (496 medical, 244 surgical, 71 cultist).

He concluded that, "Mistakes in diagnosis and treatment of patients with functional, psychosomatic, psychoneurotic or actual psychotic disorders are so common as gravely to discredit the acumen of the medical profession. The most important problem before our profession is the need for greater interest and more accurate knowledge about psychiatry." One approach to this problem, one step toward establishing a beneficial liaison between psychological and organic medicine might well be the adoption in general hospitals of routine psychometric screening methods.

It can conservatively be stated that a laboratory test of the M. Inventory type, would reveal a greater amount of significant and unsuspected pathology than do standard tests such as the blood Kahn, which are universal requisites of clinicians. In the likelihood that intricacies in its interpretation would controvert the feasibility of the M. Inventory's widespread use in extra-psychiatric medicine, it should be recognized that the gains which could be realized would heavily outweigh a considerable bulk of minor deterrents.

Tests such as the M. Inventory have the strong recommendation of objectivity, and advantages are gained by eliminating the inevitable influence of the psychiatric interviewer's personality. All questions are introduced with equal force and emphasis; most functions of the psychobiological organism are examined; possible bias in selection of material by the interviewer is avoided; the patient is not tempted to give answers aimed to please or to antagonize the psychiatrist; a true scale of subjective responses is obtained.

Unfortunately, the test lacks the constructive attributes of the patient-interviewer contact. All biographical data are not in the same ratio of significance, and evaluation of the patient's story is necessitated. Question and answer techniques of this type depend

solely upon the subject's own concept of his anamnesis and beliefs, without regard to his behavior performance. Only a single expression of the testee's behavior is recorded, his subjective reaction to a long series of objective statements.

Use of the M. Inventory encourages the patient to trust that his case is being thoroughly investigated. The new patient tends to approach the psychiatrist, as he does his family physician, with an organic outlook, and is often assailed with doubt and uncertainty when first acquainted with the intangible nature of his illness. A mathematically scored test, comparably with a thermometer, a blood count, or a B.M.R., creates an impression of concreteness in the clinical procedure, and is consequently of therapeutic value in allaying some anxiety and reinforcing the psychiatrist's authority.

The M. Inventory has been disparaged as lengthy and unwieldy. Admittedly it does exact an hour's attention from the testee and 15-20 minutes from the tester for scoring. It is, on the other hand, most helpfully economical of the doctor's time. In the length of the test certain advantages are innate. The very weight of 550 statements, with the time required to study them, discourages dissembling, evasion, understatement, neurotic exaggeration. To maintain an assumed attitude through such labyrinthine interrogation is difficult.

The liability of tests such as the M. Inventory to conscious and deliberate distortion prompted the inclusion of "lie" and " validity" statements in an effort to circumvent such misuse of the test. The 15 lie questions indicate whether the subject is attempting to place himself in an improbably acceptable light. Sample statements are "I do not read every editorial in the newspaper every day" and "I gossip a little at times." Sixteen of the 400 patients made lie (L) scores over 70, and their records were discarded. Clinical evaluation of these patients substantiated for the most part the possibility of their malingering. All of the 100 control records contained normal L scores.

The validity (F) score is obtained from responses to 64 statements not used in forming any of the nine diagnostic scales and only very rarely answered scorably by normal control testees. Hathaway and McKinley believe a high F score usually invalidates the record, but Kazan and Scheinberg(11) have recently taken exception to this view. This writer's results agree completely with the conclusion of the latter authors. Thirty per cent (93) of the 316 patients had an F score above the critical level of 70. Manifestly, declaring 30% of the records invalid would nullify the whole test.

Kazan and Scheinberg found also that a high F score is generally associated with multiple high scores on the diagnostic scales, and, rather than a negation of the M. Inventory, is a reliable indicator of major pathology. Out of a possible 9 in the diagnostic categories, the 93 patients mentioned above averaged 7.9 abnormal (over 70) scores; while the total 316 patients averaged only 5.66 abnormal scores.

The M. Inventory type of criterion, designed to disclose abnormalities of personality structure, fills a potentially vital niche in the rack of psychiatric armament. It is based on the sound psychobiological principle that immediate symptoms of psychic maladjustment stem from long term developmental aberrations in the personality. The ultimate in objective questionnaire techniques of this character is yet to be evolved; but the M. Inventory, which has been painstakingly validated over a period of years and complies with psychological statistical standards of accuracy and deviation, seems the best approach to date.

Conclusions

1. The Minnesota Multiphasic Personality Inventory (M. Inventory) was evaluated by application to 416 United States Army enlisted personnel. Results in this study present convincing evidence that the test is a valuable psychometric adjunct to clinical psychiatric practice.

2. It does not establish definitive diagnoses; it sometimes overemphasizes certain personality distortions and minimizes others; it requires interpretation in the light of the total clinical picture; it is not a substitute for the psychiatrist.

3. Anxiety may be satisfactorily measured

by averaging the scores of the first three M. Inventory scales, hypochondriasis (Hs), depression (D), and hysteria (Hy), to form an A (anxiety) score.

4. The M. Inventory elicits significant data in several psychosomatic illnesses. In migraine, post-traumatic headache, epilepsy, somnambulism and enuresis it meets clinical expectations to a high degree.

5. M. Inventory retests at intervals prove dependable in following the clinical course and helpful in determining the prognosis.

6. The M. Inventory makes its most constructive contribution to clinical medicine in illuminating the study of individual cases through combinations of its multiple scores which reveal many facets of the disturbed personality.

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RORSCHACH'S TEST AS A DIAGNOSTIC AID IN BRAIN INJURY

JOHN A. AITA, CAPT., M.C., A.U.S., RALPH M. REITAN, B.A., AND JANE M. RUTH, B.A.[1]

PROBLEM

In many cases of head injury it is difficult to determine the degree to which the resultant disability is due to an organic cerebral lesion or to a functional psychological disturbance. Rorschach's test, aside from its value as a reflector of personality structure, has been reported as helpful in the detection and evaluation of organic cerebral alteration (4, 5, 6, 7). Our problem for investigation has been the determination of value of Rorschach's test in cases of head injury.

CASE MATERIAL

Case material has been taken from the wards of a neurological-neurosurgical service of an army general hospital. With few exceptions the patients were tested three to six months after injury. They were all hospitalized at the time of examination.

Control cases came from the same wards and of necessity included those with minor closed head injuries, psychoneuroses, idiopathic headaches, and a few patients who had one or two convulsions of unknown etiology. In all cases classified in the control group, it was the unequivocal opinion of the neurologist (J. A. A.) that no organic cerebral alteration existed. Cases in which the question of brain injury was not conclusively answered were omitted from the study. The control cases were not told that they were controls. They believed that they took the test as part of their routine examination. The practical value of this study may be enhanced by the fact that our controls cannot be considered strictly "normal." In a hospital situation the task is not to differentiate between "normals" and patients with pathology, but to differentiate between patients with various types of disturbances. This practical approach has been followed in comparing our brain injured and control patients.

All cases classified as having brain injury were attested by surgeons' reports, neurological findings and pneumoencephalograms. These patients differ somewhat from the average civilian cases, in that most of them were struck with missiles and were exposed to front-line combat experiences. These men previously met the minimum physical and mental qualifications for induction into service and for overseas combat duty. Nineteen patients had been aphasic at one time, but all were clinically recovered to the extent that responses appeared in no way hindered.

For purposes of careful study the brain injured patients were divided into three groups; severe, moderate and mild. This was done on the basis of loss of consciousness (immediate, delayed, duration), amnesia (retrograde, anterograde, duration), surgeons' notes concerning the wound, pneumoencephalograms, presence of foreign bodies (depth, number, scatter), neurological signs, clinical impression of mental status, and reports of personality change by those who knew the patient many years.

METHODS AND PROCEDURE

In this study our attention will be primarily directed to three aspects of the Rorschach testing situation: (1) an analysis of overt types of behavior and other "signs" displayed by brain injured and control patients during the test administration; (2) an investigation of the quantitative data derived from the test records in each group; and (3) a review of the interpretive material in an effort to find common personality factors among the brain injured patients.

The brain injured group included 60 patients and the control group, 100. Piotrowski (7) has postulated ten specific signs

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which he has found to be of value in determining the presence of organic cerebral alteration. Inasmuch as this study includes an evaluation of the diagnostic significance of these signs, in post-traumatic cases, it is pertinent to list them here: (1)R—total number of responses less than 15; (2) T/R —average response time exceeding one minute; (3) M—no more than one human movement response; (4) Cn—at least one occurrence of color naming; (5) F+%—below 70; (6) P%—popular response percentage below 25, in records with 25 or less responses as stated by Kelley(6); (7) Rpt —repetition or the occurrence of similar responses, three times in a record, without regard for form; (8) Imp—impotence, or the recognition of the inadequacy of a response with the inability to either improve or withdraw it; (9) Plx—perplexity, or the subject's distrust of his own ability and a request for reassurance; (10) AP—automatic phrases, or the use of a stereotyped phrase in an indiscriminate fashion in more than half of the cards.

Kelley(5, 6) has discussed the presence of impairment in abstract thinking which is frequently found in patients with organic cerebral alteration. He has pointed out that this specific disability is reflected in the subjects' inability to use the same figure or detail for more than one association, in their inability to give clear definitions of responses, and in their tendency to consider the blots as actual objects. Kelley suggested that the sign "Abs" be scored when these types of behavior occur. We have found in working with brain injured patients that one of these signs is sometimes present alone. Therefore, if scored separately, they may be of greater value. These signs, in addition to six others which we have considered, will be named, described and briefly discussed.

Inflexibility (*Iflx*).—This sign occurs when the subject, in his entire record of responses, does not use any part of the figure for more than one association. As Kelley(5) has noted, the subject sometimes voices an expression that, "This cannot be——— (something else), because it is a———(original association)." This sign was not scored if the subject gave a detail response and then an unrelated whole response. If the subject did this it would be clear that he had the ability to use the detail in another way, even though incorporated into a whole response. The sign, also, was not scored if any part of the ten ink-blots was used for two unrelated associations. Subjects for whom this sign was scored sometimes showed a tendency to elaborate the first impression received from a card, although often meagerly, rather than to drop the initial association from immediate consideration and form new and unrelated ones. This sign differs from "repetition" in that responses to individual cards are considered in determining whether or not the sign should be scored, rather than similar responses to succeeding cards.

Consideration of blots as actual objects (*Act Obj*).—This sign represents an extreme form of concretization in thinking. We have found that many brain injured patients will reply in the negative when asked, after the test administration, if they believe that the blots represented actual objects. This occurred even though the test records gave evidence that the patient did think they were identifying actual figures. Therefore, we have scored this sign when a review of the record revealed the use of a phrase such as, "This is a ———." If qualifying terms such as "looks like" or "might be" were used, the sign was not scored. The occurrence of this sign is often followed by "perplexity." The subject believes that he is to identify actual objects even though told that the figures are ink-blots. As a result of his frustration in being unable to find actual representations, he begins to distrust his ability and seeks reassurance.

Concrete responses (*CR*).—This sign was scored when, throughout the record, no responses were given which characterized a quality or attribute of the figure or object mentioned. If a response such as "two distinguished men" or "a Grecian urn" occurred, the sign was not scored. This sign is undoubtedly related to a subject's intellectual level and extent of training and background, but it is also very likely related to abstract thinking ability and is shown later in the paper to be of value.

Unclear Definition of Response (*Def*).—This sign does not become apparent until

the "inquiry." It has been noted by Kelley (5, 6) that if the inquiry is conducted carefully, it is possible to detect a comparative lack of ability, among some brain injured persons, to clearly point out the specific details of responses. The subject has a general impression but is impaired in his ability to define specifically the individual elements comprising the response. This sign was scored if it occurred at least once in a record.

Catastrophic reactions (*Catas*).—The name for this sign was borrowed from Goldstein(3). Catastrophic reactions consist of overt emotional displays (expressed in words, by groaning, etc.) during the test administration. This sign, we believe, springs from the frustration which the test situation occasionally presents. It is closely related to Piotrowski's signs of "impotence" and "perplexity," but it is expressed by a different type of behavior. Color or shading "shock" is sometimes present with this sign, but it has been scored only when an overt emotional reaction has occurred.

Edging (*Edg*).—The term "edging" has been described and associated with schizophrenia by Beck(2). It consists of holding the card at unusual angles, peering at it from a side view, etc. In our Rorschach testing we have noted its occurrence particularly among the brain injured patients. This may be another reaction to frustration. The patients may be trying every possible approach to yield results. It has been scored if it occurred at least once in a record.

Irrelevant comments (*IC*).—This sign was scored when a patient made a comment which was not pertinent in any observable way to the testing situation. It usually occurred during the short interim between the presentation of cards. For example, just after returning card V. one patient remarked, "What is that new doctor doing next door? Is he here to take the place of ———?" We believe that this type of behavior is a reflection of the subject's lack of attention to the task at hand, or the ease with which the patient's thinking is distracted. Goldstein(3) has noted similar behavior in his brain injured patients.

Covers parts of cards (*Cvr Cds*).—This sign was scored when a patient covered part of the card while attempting to give responses. This type of behavior, we believe, is adopted as an attempt to exclude certain stimuli which are interfering with the subject's concentration on a specific detail. It may reflect the subject's attempt to adjust to his easy distractibility by external stimuli, also a factor noted by Goldstein(3).

Withdrawal and re-attack (*WR*).—This sign occurs when a subject voluntarily removes his attention from a card, perhaps looking in another direction or turning the card over, and suddenly renews his scrutiny. In using this method the subject may be trying to get a new view of the situation, a different mental set. Perhaps this sign springs from "inflexibility" and is an attempt to overcome it.

Several other types of behavior have been considered as possible signs of cerebral deficit. As a result of findings by Harrower-Erickson(4) and Strauss and Werner(8), we investigated the frequency of the occurrence of vista responses in brain injured and control groups. Excessive card turning, as a possible reaction to the frustration of being unable to form adequate associations, was also studied. The level of organizational ability (Z score) was compared with the number of responses in each of the groups in order to determine whether or not this ratio is significant in differentiation. The frequency of rejections of specific cards was also investigated.

As an additional approach, a comparative analysis was made of the quantitative data derived from the records in each group. This consisted of the determination of the frequency of occurrence of the various scoring determinants and content classifications.

The final step was to review the records from the viewpoint of interpretation in an effort to detect types of personality disturbances common to patients with brain injury.

Results and Discussion

The first step has been to investigate the diagnostic value of Piotrowski's signs in the detection of organic cerebral alteration. It must be noted that the signs to be considered may occur in clinical groups other than brain injured patients, with varying frequency. Many of our control cases had neurotic dis-

turbances and thus the task of differentiation was probably more difficult than if the brain injured patients had been compared with normal controls. The findings reported below are probably of increased value, because our procedure was designed to determine the effectiveness of Rorschach's test in a practical situation. However, in order to present conclusive findings, the brain injured patients should be compared eventually with other specific clinical groups. Such a method would give further information necessary for adequate differential diagnosis.

Table I presents the distribution constants, significance of differences in terms of "t" values, and the percentage of patients in each group showing the various signs.

R, or total number of responses less than 15, is not of particular value except among patients with severe injuries. The brain injured sub-groups have means which are below that for the controls, but these differences are not large enough to be of significance.

The average response time is more helpful in differentiating the total groups. In this case, too, the severely injured show the greatest differences. The sign is of little value in moderate and mild cases. Our results suggest that Piotrowski's critical level of more than 60 seconds is set too low for most effective differentiation. Because of the large standard deviations, however, the sign is probably not of great value in individual diagnosis, regardless of where the critical level is located.

The mean number of M responses is not significantly different in comparing the brain injured patients with the controls. However, in both groups a considerable number of patients had no M responses. Because of the difficulty in evaluating zeros in calculating an average, the distribution constants may not adequately compare the groups. We have also computed the percentage of patients having at least one M response. These figures indicate that only the severely injured show a difference in this respect which is of practical significance.

Color naming, a sign Piotrowski found to

TABLE I

DISTRIBUTION CONSTANTS, SIGNIFICANCE OF DIFFERENCES IN TERMS OF "t" VALUES, AND PERCENTAGE OF PATIENTS SHOWING PIOTROWSKI'S SIGNS

	N	R	T/R	M	Cn	F + %	P%	Rpt.	Imp.	Plx.	A. P.
Controls	100										
Means		28.06	59.73″	1.92			6.07				
%'s				73.00	3.0	74.48	33.11	11.0	9.0	15.0	12.0
S. D.		15.084	28.804	2.087			2.251				
Brain Injured	60										
Means		24.03	75.42″	1.73			4.88				
%'s				66.67	11.7	68.83	30.40	21.7	41.6	45.0	26.7
S. D.		20.664	39.917	2.032			2.443				
"t"		0.613	2.84	0.555			3.098				
Severe	11										
Means		15.9	93.7″	0.45			3.50				
%'s				36.36	9.09	63.03	25.09	18.18	72.73	63.64	36.36
S. D.		8.306	52.676	0.656			1.373				
"t"		2.620	3.329	2.311			3.692				
Moderate	21										
Means		24.71	76.00″	1.76			5.00				
%'s				76.19	4.76	65.13	33.99	19.05	47.62	47.62	23.81
S. D.		19.265	38.065	1.630			2.309				
"t"		n. s.	2.215	n. s.			1.948				
Mild	28										
Means		26.71	68.9″	2.21			5.32				
%'s				71.44	18.0	70.83	30.21	25.0	25.0	35.6	25.0
S. D.		24.003	32.608	2.411			2.673				
"t"		n. s.	1.429	n. s.			1.476				

be of value, occurs more frequently among the brain injured patients than among the controls. However, our results suggest that this sign is found relatively infrequently among post-traumatic cases, and its value is thus restricted. Color naming occurs most often in our mild brain injured group. This may indicate a greater value of the sign in that it is most effective in the group which presents the greatest difficulty in differential diagnosis.

The F+% does not show a great difference between the groups. Although the percentage for the total brain injured group is 68.83, the percentage for the controls is only 74.48. The difference between the percentages in the two groups is not sufficient to be of value in individual diagnosis. This finding is of value because it indicates that post-traumatic brain injured men retain, to a fair degree, their sense of reality.

The popular response percentage, in records with 25 or less responses, is not of great significance. The mean number of popular responses is slightly higher for the controls, but the mean number of total responses is also higher, and the percentage is approximately the same in each group. The means are of greater differentiating value than the percentages. In comparing the total groups a statistically significant difference is found. The mean for the severely injured is also significantly different. However, the practical significance of this finding is negligible because the actual difference between the means is not great enough to be of help in individual diagnosis.

Repetition is shown to be of some value, even though this sign does not occur in the majority of cases in either group. This sign seems to be of greatest importance in identifying patients with mild brain injuries.

The results of this study indicate that impotence is one of the most important signs that Piotrowski has postulated. As shown in table I, 41.6% of the brain injured patients and only 9% of the controls gave evidence of this sign. It will be noted, however, that as the severity of the injury decreases, impotence occurs less frequently. Our experience suggests that the extent to which the sign is present in an individual record is positively related to the degree of intellectual impairment and personality changes. This sign, therefore, is valuable not only as an indicator of brain injury, but also as a suggestion of the extent of the resultant disturbances.

Perplexity ranks approximately with impotence in the degree to which it indicates the presence of brain injury and its after-effects. The results suggest that it is of somewhat greater value than impotence in diagnosis of persons with mild brain injuries. However, perplexity occurs slightly more frequently than impotence among our controls.

Automatic phrases closely approximates repetition in importance. Our results indicate, however, that the presence of automatic phrases is more frequently associated with severe damage, although it also is present in about 25% of the patients with moderate and mild injuries.

Table II presents the percentage of patients in our brain injured and control groups who gave evidence of the additional signs which were mentioned in the previous section.

Inflexibility occurs more frequently among the controls than do any of Piotrowski's signs. However, it occurs over twice as often among the brain injured as among the controls, and is thus of definite value. Although the frequency of the occurrence of this sign decreases as the severity of the injury decreases, it does "hold up" fairly well. In our mildly injured group, 57 percent of the patients showed the presence of this sign.

Consideration of blots as actual objects is found in 25% of our control patients. It was present in 70% of the brain injured cases.

The results indicate that this sign is particularly helpful in identifying patients with mild and moderate organic cerebral alterations. This feature of the sign increases its value, because patients with less severe injuries generally give fewer indications.

Concrete responses is a sign which is present to a considerable degree in each group. Because of this, its presence must be interpreted cautiously. Its frequency is definitely greater in our brain injured group than in our controls, however, and this indicates that it is of some value. This sign occurred in 100% of our severely injured patients and

less frequently in our moderate and mild sub-groups.

Unclear definition of responses is one of the most helpful signs to be discussed. It was present in 70% of the brain injured patients and 15% of the controls. As noted earlier, a carefully conducted inquiry is necessary to detect the presence of this sign. The frequency with which this sign occurs drops off rapidly as the severity of the injury decreases. Nevertheless, 53.6% of the mildly injured group showed the sign.

Covers parts of cards is a sign which ranks approximately with repetition and automatic phrases. It occurs a little less frequently (18.3%), but it is also present in fewer of the controls. This type of behavior is used more frequently by patients with moderate and mild injuries than by those with severe injury. If the patient shows the ability to use this method to overcome his distractibility by external stimuli, an indication may be present that the impairment is not extreme.

TABLE II

PERCENTAGE OF PATIENTS SHOWING ADDITIONAL SIGNS PROPOSED BY THIS STUDY

	Iflx.	Act. Obj.	CR	Def.	Catas.	Edg.	IC	Cov. Cds.	WR
Controls %'s	28.0	25.0	48.0	15.0	1.0	17.0	4.0	6.0	3.0
Brain Injured %'s	61.7	70.0	86.7	70.0	31.7	41.6	21.7	18.3	8.3
Severe %'s	72.73	63.64	100.	100.	72.73	63.64	45.45	9.09	27.27
Moderate %'s	66.67	76.19	90.48	76.19	23.81	33.33	23.81	23.81	0.0
Mild %'s	57.1	68.0	78.6	53.6	21.4	39.0	10.7	18.0	7.1

Catastrophic reaction is another valuable sign. It does not occur frequently in either group, but when it is present it is almost definitely pathognomic. Only 1% of our controls and 31.7% of our brain injured cases gave evidence of the sign. The sign occurs most frequently in the severely injured, although over 20% of each of the moderate and mild sub-groups also demonstrated it.

Our results show that "edging" is an important sign, ranking slightly below perplexity. It occurs in 41.6% of the brain injured patients and 17% of the controls. Edging "holds up" fairly well in the mild cases. In these it is probably more valuable than any of Piotrowski's signs.

Irrelevant comments is not present frequently in either group. The primary value of this sign is that it occurs in only 4% of the controls. Thus, being present in 21.7% of the brain injured patients, its occurrence may be considered a valuable indication of organic cerebral alteration. However, in mild cases, this sign is present only 10.7% of the time. Irrelevant comments is mainly associated with serious damage.

Withdrawal and re-attack is valuable in cases of severe brain injury. It rarely occurs among controls (3%), and Table II shows that it is of little help in distinguishing patients with mild and moderate injury.

In addition to the above, several possible signs of brain injury were investigated which did not prove to be of great value. The mean number of vista responses does not differentiate between our brain injured groups and the controls, except for the severely injured. The percentage of cases with vista responses is of greater value than the means. Our results indicate that patients with severe and moderate cerebral injuries have at least one vista response in only 20 to 25% of their records, and 46% of the controls have at least one of these responses. Excessive card turning was not found to be of help in detecting brain injury. The level of organizational ability (Z score) in relation to the number of responses is also of little value. It is in-

teresting to note that the mean Z score approximately equalled the mean number of responses in each of our groups.

An investigation was made of the frequency of rejection of specific cards and the percentage of patients who rejected at least one card. The results are shown in Table III.

In comparing the rejections of the brain injured with the controls, it is apparent that cards 5, 6, and 9 show the largest differences. These findings may be of some assistance as substantiating evidence if other indications of organic cerebral alteration are present.

The quantitative data derived from the psychograms were also studied. Table IV presents the distribution constants, the significance of differences in terms of "t" values, and percentage of the records containing the various scoring determinants. In some cases the means were so small the significance of difference would have little practical value. In these instances they were not calculated.

TABLE III

PERCENTAGE OF REJECTIONS

Groups	N	Card 1	Card 2	Card 3	Card 4	Card 5	Card 6	Card 7	Card 8	Card 9	Card 10	Patients rejecting at least one card
Severe	11	9	18	0	0	27	27	9	9	45	0	55
Moderate	21	5	9	10	10	5	24	10	0	14	14	37
Mild	28	4	4	7	7	11	14	7	4	18	18	36
Total Brain Injured	60	5	8	7	7	12	22	8	3	22	13	40
Controls	100	2	5	7	6	2	14	13	1	9	9	33

TABLE IV

DISTRIBUTION CONSTANTS, SIGNIFICANCE OF DIFFERENCES IN TERMS OF "t" VALUES, AND PERCENTAGE OF RECORDS CONTAINING THE VARIOUS SCORING DETERMINANTS

	N	R	W	DW	D	Dd	App.	Exp.	Z	F +	F −
Controls	100										
Means		28.06	7.44	.15	17.68	2.75	W!D(Dd)	1.92:3.80	29.70	11.91	4.08
S. D.		15.084	6.136		9.617				23.466	5.852	3.375
%						51.67					
Brain Injured	60										
Means		24.03	5.72	.12	15.60	2.62	W!D(Dd)	1.73:3.24	22.21	9.37	4.48
S. D.		20.664	4.564		14.245				16.629	7.880	4.345
"t"		0.613	1.857	n. s.	1.045	n. s.			2.141	2.299	n. s.
%						62.00					

	C	CF	FC	V	VF	FV	V	YF	FY	S	A%
Controls											
Means	1.01	1.35	1.86	....	.07	1.03	0.11	0.36	3.32	3.08	
%	43.00	56.00	68.00	0	5.00	43.00	9.00	18.00	84.00	76.00	44.98
Brain Injured											
Means	0.95	0.87	1.88	0.05	0.03	1.43	0.15	0.22	2.20	3.00	
"t"	n. s.		n. s.				n. s.				
%	40.00	48.33	71.67	1.67	1.67	36.67	10.00	13.33	61.67	68.83	44.94

The number of responses, already discussed, does not significantly differentiate the groups. The number of W, D, and Dd responses also is not helpful in this respect. The average approach for each group has been calculated following Beck's suggestion (1) that the normal approach reflects a W, D, Dd distribution of 6, 20, 4. We find in our cases that W is weighted in using this formula. This cannot be construed as a disagreement with Beck's figures, because our

control group consisted of hospitalized patients and cannot be considered strictly normal.

The experience balance is similar in each group. The mean Z scores, though lower for the brain injured group, are not significantly different. The mean number of F+ responses in each group shows a difference which is significant at the 1% level. Although this does differentiate between the groups, it is of little assistance in identifying individuals with brain injury. The mean number of F− responses was not found to be of value.

Because many of the records had none of the scoring determinants that remain to be discussed, the mean number will be given little emphasis. It is clear that the means offer little help in an individual situation. A comparison of the percentage of records in each group having at least one of the remaining scoring determinants is of slightly greater value.

In general, a greater percentage of the controls gave responses which made use of each of the scoring determinants. The controls gave CF responses slightly more often than did the brain injured patients, but the C and FC responses show insignificant differences. The vista responses also are of little help as earlier mentioned, although FV responses are slightly more frequent among the controls. Except for FY, the Y responses are of little value. FY responses, however, occur in 84% of the controls and only 61.67% of the brain injured patients. The absence of FY, therefore, may be a corroborating factor if other indications point toward organic cerebral alteration. Included among the responses scored FY were texture and surface shading. White space (S) responses are slightly more frequent among the controls but are of no practical significance.

It can hardly be expected that a single quantitative factor will adequately differentiate the brain injured and control groups. Interpretation of the individual record may yield more promising results. Interpretation, of course, necessitates a consideration of the influences of one factor upon another, and results in an integrated reflection of the personality structure.

The frequency of occurrence of responses falling into the various content classifications was also investigated. The results show insignificant differences between the groups. The mean number of H, Hd, A, and Ad responses, particularly, are nearly equivalent in the brain injured and control groups.

The records in each sub-group of the brain injured patients and those in the control group were examined in an effort to find common factors in interpretation. We have no "normal" base line from which to make a comparative analysis, because many of our controls gave indications of neurotic disturbances. Nevertheless, certain types of disorders, aside from intellectual impairment, are consistently present in the brain injured patients. It will be of value to point these out, primarily to stimulate further investigations in which individuals with organic cerebral alterations can be compared with cases which fall more closely into the "normal" range than do our controls.

The patients with severe injury, without exception, gave indications of the presence of anxiety. The anxiety states ranged from mild to severe disturbances. A high percentage of these records also suggested the presence of depression and hypochondriasis in varying degrees. Relatively poor emotional control and adjustment were present, although this was not found as frequently as the above factors. In the case of one patient with fairly normal adjustments prior to injury the test results closely resembled those common to schizophrenia. In each of the cases in this group signs of cerebral deficit were unmistakably present.

In the group with moderate cerebral injuries a few records reflected normal personality adjustments, but indications of anxiety and depression were frequently present. Suggestions of hypochondriasis occurred somewhat less frequently. Several of the test results gave indications of schizophrenic-like disturbances.

Anxiety indications were consistently present in the mildly injured group. Feelings of inferiority were also found often in these records. This may be a result of the patients' comparatively greater ability to understand the possible future effects of their injuries. Some of the cases evidenced trends of mild depression and hypochondriasis. A

few in this group also showed the presence of schizophrenic-like disturbances.

Each of the types of disturbances mentioned above was present more often among our brain injured patients than among the controls, even though many of the controls had at least mild neurotic disturbances. These common interpretive factors cannot differentiate between persons with and without organic cerebral alterations, but they do indicate personality maladjustments that are frequently among the after-effects of brain injury.

In a following study we shall consider the influence of intelligence upon the occurrence of the Rorschach signs of brain injury that have been discussed. It is immediately apparent that the intelligence of the subject is of significance in determining the presence or absence of at least some of the signs. Therefore, it is of value to know the extent to which the signs must be present, in the various intelligence levels, before the possibility of brain injury can be indicated.

Conclusions

The findings in this study suggest that impotence and perplexity are the most important of Piotrowski's signs in identifying persons with post-traumatic cerebral injury. Automatic phrases and repetition are also of definite value. Color naming occurs less frequently in both brain injured and control patients than those mentioned above. However, it occurs so rarely among controls that it is also of diagnostic value. The results suggest that color naming is most helpful in cases with mild injuries. The number of M responses, average response time, and total number of responses are not of significant value except among patients with severe cerebral injuries. The F+% is generally lower among brain injured patients than among the controls, but this difference is not sufficient to be helpful in individual diagnosis. The popular response percentage, in records of 25 or less responses, was not found to be of value. The mean number of popular responses may be of assistance in identifying patients with severe injuries, although its importance is negligible in the moderate and mild cases.

Of the nine additional signs which we have named and evaluated, unclear definition of responses is probably the most important. This sign was present in 70% of the brain injured patients and only 15% of the controls. Consideration of blots as actual objects is also of definite assistance. It "holds up" very well in patients with mild cerebral injuries. Catastrophic reaction occurs in only 31.7% of the brain injured patients. However, its occurrence strongly suggests the presence of organic cerebral alteration because it is found in only 1% of the control patients. Inflexibility is also of definite value, being present in 61.7% of the brain injured and 28% of the control cases. This sign is of definite help in identifying patients with mild cerebral injuries. Irrelevant comments is usually found only in patients with moderate or severe injuries although it is probably also of some value in diagnosing mild brain injuries. Edging is present frequently among brain injured cases and is of help in differentiating these patients from our controls. This sign is slightly less important than perplexity. Concrete responses occurs in 48% of the controls and thus must be interpreted with caution. Its presence in 86.7% of the brain injured patients justifies including it among possible indicators of cerebral damage. Covers parts of cards is valuable primarily in identifying patients with mild and moderate injuries. It is of little help in cases with severe cerebral alterations. Withdrawal and re-attack, conversely, is associated almost exclusively with severe injury.

An analysis of the quantitative data derived from the test records gave little information which can be used in differentiating post-traumatic brain injured patients and controls.

Certain common factors in interpretation are present in the records of brain injured patients. Anxiety was consistently reflected in each of the brain injured sub-groups. Feelings of depression were also regularly present in each subgroup, though not as frequently among the patients with mild injuries. Hypochondriasis was found most frequently among the severely injured, but was also often reflected in the records of the remaining patients with cerebral damage.

Occasional schizophrenic-like records occurred in each of the brain injured sub-groups. Impaired emotional control was significantly present only among patients with severe injuries.

Summary

The Rorschach test records of 60 posttraumatic, brain injured patients have been compared with those of 100 control patients in an effort to find factors characteristic of organic cerebral alterations. Piotrowski's ten signs of cerebral disturbance have been evaluated. The results indicate that impotence, perplexity, automatic phrases, repetition, and color naming are of value in identifying brain injured patients. Nine additional signs, which are found to be helpful in diagnosis, are named and discussed. A review of the test records from an interpretive viewpoint indicates that anxiety, depression and hypochondriasis were frequently present and schizophrenic-like disturbances were occasionally present among the brain injured patients.

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SITUATIONAL AND ATTITUDINAL INFLUENCES ON RORSCHACH RESPONSES

ABRAHAM S. LUCHINS, PH. D.,[1] NEW YORK, N. Y.

THE SUBJECTS

The Rorschach test has been widely employed as a clinical tool in army installations. Recently there was a discussion of Rorschach data obtained from duty personnel in an army installation(8). This paper deals with data obtained in a number of army hospitals by various clinicians.

The writer was given access to the Rorschach records of all the patients who in the past 13 months had been referred for consultation to the neuropsychiatric service of a large military hospital.[2] Since we were interested in normal individuals' responses to the Rorschach, we selected the data of those patients (henceforth to be called the C-group) whose clinical records, case histories, and scores on all tests administered by the neuropsychiatric service, other than the Rorschach, were negative.[3] Aside from the fact that the 351 soldiers in the C-group had been sent to the neuropsychiatric service, usually because the medical service thought that their complaints were out of proportion to the findings of the physical examinations, they could be considered as psychiatrically "normal." All their Rorschach protocols had been analyzed in accordance with the directions given by Beck(2).

An analysis was also made of data from 256 Rorschach examinations administered and scored by the writer or one of his colleagues at three other military hospitals. The soldiers in this group (henceforth to be known as the L-group) include 80 who were duty personnel, *e. g.*, nurses or occupational therapists, and 176 who had been referred for consultation to the neuropsychiatric services of the hospitals, but whose clinical records, etc., were negative. All the protocols of the L-group had been analyzed in accordance with the directions given by Klopfer and Kelley(7).

The C-group consisted of white male soldiers, 18 percent of whom were officers. Their ages ranged from 19-59, with 68 percent between 21-26 years. Bellevue-Wechsler scores placed 9, 24, 39, 11, 7 and 10 percent, respectively, in the borderline, dull normal, average, bright average, superior and very superior categories of adult intelligence. Only 8 percent had had less than six years of elementary school, 15 percent were public school graduates, 26 percent had attended but not graduated from high school, 23 percent were high school graduates, 13 percent had attended but not graduated from college, and 15 percent had college degrees ranging from the Bachelors to the Ph. D., D. D. S. and M. D. About 65 percent of the group came from rural communities of the southern and southwestern states.

It was mentioned above that the L-group consisted of both patients and non-patients (31 percent). About 4 percent were females, 11 percent were officers, and 14 percent were colored soldiers. Most of its members came from southeastern rural communities. On the whole, the L-group was of somewhat lower educational and intellectual status than the C-group.

PRESENTATION OF RESULTS

In discussing the various types of responses to the Rorschach plates, some authors, *e. g.*, Bochner and Halpern(3), Brussel and Hitch(4), Klopfer and Kelley(7), and Rorschach(12), give results made by "normal" civilians. Although these numbers are not presented as standardized norms, they are indicated, by implication in some instances, as reference points for analysis of protocols. Since these manuals have been

[1] Assistant Professor of Psychology and Director of the Guidance Bureau, Yeshiva University, New York, New York.

[2] This was accomplished through the courtesy of Jessie H. Craft who had administered and scored the Rorschach examinations.

[3] It would have been best to use as subjects soldiers who were not hospitalized for any reason, but not a sufficiently large number of protocols was available to the writer under this restriction.

used in the army, and one of them (4) was designed for military usage, it may be worthwhile to compare these normal reference points with the responses made by the C-group and L-group. Comparison is made difficult because most manuals do not state (a) on how many subjects' responses the results are based, (b) whether the results embrace the entire range of obtained responses, are the interquartile range, or perhaps a range of averages, and (c) whether a quoted average is a median or mode, etc. Moreover, little or no information is furnished concerning the subjects' I. Q.'s, socio-economic levels, educational and cultural backgrounds, and the circumstances of the test situation. Nonetheless, it may prove of interest to compare these normal reference points with our data.

TABLE I

	Normal				Range		Mean ± S.D.	
	Bochner and Halpern	Brussel and Hitch	Klopfer and Kelley	Rorschach	C-group	L-group	C-group	L-group
R	.....	25–50	20–40	15–30	10–91	10–51	21.2 ± 10.9	20.1 ± 7.9
W%	25–30	25–30	30	.....	0–91	0–93	16.8 ± 3.1	14.2 ± 1.8
D%	65–70	40–60	.....	.....	0–95	0–97	79.2 ± 9.2	73.6 ± 3.7
d and Dd%	10	10	5–15	.....	0–93	0–93	0.7 ± 2.6	1.6 ± 2.8
F%	20–50	50–55	50	.....	44–100	56–100	60.4 ± 26.3	87.2 ± 9.7
A%	35–50	25–50	.....	30–55	0–93	0–91	62.5 ± 3.6	64.3 ± 4.6
Pop.%	20	20–30	.....	.....	0–67	0–60	15.4 ± 2.9	13.6 ± 2.6
O%	10–20	15–20	.....	0–20	*	0–6	*	0.5 ± 1.9
M	1–3	2–5	1–3	2–4	0–8	0–6	1.1 ± 1.4	1.0 ± 1.2

* Beck's method of analysis does not include O responses.

Table I contains for the various categories of responses the figures presented for normal individuals by these authors,[4] and the entire range as well as the mean together with its standard deviation for the C- and L-groups. The table does not include the protocols of those of our subjects who gave a total of less than 10 responses, because such a protocol was considered to contain insufficient data for analysis. Thus, 20 subjects of the C-group and 28 subjects of the L-group were omitted.

An examination of table I reveals that the various authors differ somewhat among themselves in their normal reference points. The C- and L-groups, although one consisted exclusively of patients and the other included non-patients, although they differed in composition in some other respects, and even though their protocols were scored in accordance with the directions of different manuals, show similar results in most categories. Our data differ, in some categories rather strikingly, from those given by some or all of the other authors. Note the smaller lower limit for our groups' total number of responses (R)—and this would have been even lower if subjects who gave less than 10 responses had been included—the decrease in average W, d and Dd, M and O reactions, and the increase in average F, A and D reactions.

Linn (8) also noted discrepancies between his results, based on normal soldiers, and those given by these manuals. Some of the discrepancies he found follow the same trend that we observed, *e. g.*, the increase in F and A and the decrease in M, but in a number of categories his data differ sharply from ours (*cf.* 8, page 23). He puts forth the following hypothesis in an attempt to explain why his soldiers showed norms which differed from those based on civilian populations.

> Adaptation to military life involves drastic and deep-seated changes in the behavior and thinking of the individual. The life of the soldier is regimented and ritualized. . . . . In making this adjustment the individual regresses to a less mature level of performance. He becomes constricted in his interests, ambitions and energy output. . . . . If this vast transformation in the thinking and behavior of the draftee did not manifest itself in a new set of "normals" in the Rorschach test, it would be truly remarkable. . . . . Actually the Rorschach results reflect these changes very well. In the test situation the individual does no more than he has to. The result is a great diminution in

[4] The figures are taken from the table given by Linn (8, page 23).

the number and quality of the responses . . . . high reliance on popular responses and "cheap" responses involving poor form and demanding a minimum of intellectual effort. . . . . Stereotypy of thinking is evident in the limited content of the responses, and the high F and A percentages. Poverty of inner life and emotional immaturity is evidenced by the amazing lack of human movement (8, pages 21-22).

This explanation does not seem to be wholly satisfactory for the subjects of this study. For some of them, who had come from circumscribed homes or communities, army life represented freedom rather than regimentation and ritualization. Army life in some cases brought about an increase in the number of interests and avenues of self-expression, a widening of the behavioral and geographical worlds. Moreover, discussions with the subjects and analysis of other test data revealed that many of the soldiers did not appear to have as much "poverty of inner life and emotional immaturity" as the Rorschach protocols would seem to indicate.

Readministration of the Rorschach Plates

In an attempt to understand the nature of their responses, the writer used the following procedure in the case of 103 subjects in the L-group whom he tested. After completing the inquiry part of the examination, the examiner said to the soldier, in effect, if his responses had been limited in content: "Some people see different kinds of things in these cards. They see animals, plants, human beings, or parts of these objects. Here is the first card again. Let us see whether you too can find a part of or a whole animal, plant, or human being." If he failed to give new responses, he was told to look for specific objects which he had not mentioned during the free association part of the test. To subjects who still did not respond, the examiner said, for example, "See, here is a face," and "Here is a flower," and outlined the figures with his finger. The subject was asked whether he could now see the objects and was asked to trace them. Card II was presented without comment. After one minute, if the individual gave no new responses, the procedure used in the first card was followed. In this manner, all the plates were again presented.

Where no M response, for example, had been made, the above described method was modified to fit the determinant or location feature in question.

In many cases, as we went from card to card, subjects spontaneously gave new responses. Each subject was asked, after the last card was represented, why he previously had or had not given certain responses, or why he still failed to name certain objects. This led to a discussion of their responses. A summary of their comments during this discussion is presented below.

Summary of Subjects' Comments

1. Disinterested attitude: Did not exert himself because (a) it was only inkblots, child's play, foolishness; (b) he had been given many tests in the army which usually meant nothing; (c) he saw no connection between the test and his physical ailments; (d) he resented being tested, was tired of being pushed around from doctor to doctor; (e) he was preoccupied with problems and worries and not in the mood for flights of imagination.

2. Fearful of test or tester: He was afraid that what he said would be used against him, would seem silly or "psycho." He was on guard against the officer who tested him.

3. Misunderstanding of instructions: Did not know what he had to find; not sure what was considered a correct answer; thought there was some definite figure hidden in the design which he must find; that he had to give only one response to each card; that he had to give only W responses (*cf.* the high upper limit of W responses); that what he found must contain all the features of the object named, must be perfect in all details, or else it would be considered incorrect, cheating, or "psycho." He thought that the time he took to answer was important, hurried, and became confused (for the effect of speed on thinking, see 9, pages 53-56). A few said that they had seen some sort of design but had had no name for it and therefore did not mention it.

4. Effects of present or past experiences: Some event in civilian life, sometimes related to his profession, or in the army, here or overseas, was brought to mind by the ink-

blots. He saw animals because of his farm life, hunting or fishing hobbies (*cf.* the high average of A responses with the fact that most subjects came from rural communities).

5. Literal minded: If he found one object, he could not recombine its features so that they would form something else—one cannot see two objects in the same place. He looked for shapes and not for movement because there is nothing moving on a card (note the small average of M responses).

6. Unsuccessful attempt: He really tried to see something in the inkblots but often could not succeed. (This comment was made by a number of the subjects.)

Conclusions from Subjects' Comments

From these comments it seems that it may be of importance for proper interpretation of the Rorschach protocols to determine why certain responses were or were not made. The responses may have been influenced by the subject's attitude toward the test, toward the examiner, and by assumptions about the test and his task. The protocols may thus reflect temporary adjustments or reactions and specific attitudes which are related to the test situation, rather than reflect basic personality patterns. Educational, occupational and cultural background may also have influenced the responses to the extent that these are more a reflection of this background than of the dynamics of the personality.

In view of the lack of emphasis on this matter in some of the manuals, it might not be out of place to reiterate what has become common knowledge in contemporary psychology. One's perceptions are influenced, especially in ambiguous situations, by cultural and social factors (1, 6, 10, 11, 13) and by mental sets (11, 14, 15). The Rorschach plates are ambiguous perceptual situations. How an individual structurizes them may lead to insight into his personality, but the structurization is not derived independently of social, educational and situational factors. A proper evaluation of the personality can be made only after these influencing factors are known and taken into account.

Research is needed (a) to determine the relation between various types of backgrounds and attitudes, and the different categories of responses; and (b) to develop methods of preparing the subject for the Rorschach examination so that he will face it with the proper mental set, of precluding misunderstandings of instructions and false assumptions concerning the test and the task. Also, it is the writer's impression that some individuals lack the ability to react to ambiguous perceptual situations (*cf.* comment 6). Perhaps it would be of value to devise methods of determining this in advance, and of deciding whether the subject in question is more amenable to other, *e. g.*, manipulatory, auditory or verbal test material.

Summary and Conclusions

Many of the manuals on the Rorschach present data for "normal" subjects which explicitly or implicitly are given as normal reference points. These reference points differ somewhat from manual to manual. They differ a good deal from the Rorschach data obtained from two army populations examined by the writer and his colleagues. Linn(8) also found discrepancies between the responses made by his soldiers and "normals" based on civilian populations. His explanation of the cause of the discrepancies does not seem to suffice for our groups.

An attempt to throw light on the nature of their responses led to a detailed study, in the case of some of our subjects, of each card. This involved readministration of all the plates and was followed by a discussion with the subjects of their reactions. Their comments during this discussion helped to explain why they initially responded to the Rorschach plates as they had. These comments showed that the responses had been influenced by the operation of specific attitudes toward the test and the tester, by previous experiences, and by the educational, occupational and cultural background. They suggest the importance (a) of knowing this background, (b) of knowing the subject's assumptions about and attitudes toward the test and the examiner, (c) of preparing the subject for the test so that he will face it with the proper mental set and without false assumptions, and (d) of segregating those individuals who do not react adequately to

ambiguous perceptual objects but who might give richer responses to tonal, manipulatory or verbal materials.

A partial explanation of the differences in the various normal reference points for the Rorschach examination may be that the populations on whom the norms were based differed in backgrounds and attitudes.

Perhaps the discrepancies in the "normals" is one indication of the difficulties involved when the Rorschach test, which was designed and extensively used for the diagnosis of psychiatric disorders, is applied to normal individuals. That which is an excellent tool for categorizing individuals into various disease entities, may require reevaluation before it is used for normal individuals. What may be needed is a thorough study of normal subjects' protocols without the use of present clinical concepts, percentages and ratios. This may lead to reconsideration of the significance of various categories and ratios of responses when made by normal individuals, and to the discovery of more adequate methods of studying normal personalities.

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PRELIMINARY TEST OF INTELLIGENCE

A Brief Test of Adult Intelligence Designed for Psychiatric Examiners [1]

MARGARET KELLER, Ph. D., IRVIN L. CHILD, Ph. D.,
AND
FREDERICK C. REDLICH, M. D.
New Haven, Conn.

Problem

A brief test of intellectual level, recently developed by the authors, will be reported here. The test has been named the Preliminary Test of Intelligence (abbreviated to P. T. I.). It has been designed primarily to meet the needs of the psychiatric examiner, but it may also be useful to other clinical examiners who find it important to make a tentative and rapid appraisal of the intellectual capacity of the patient.

Every psychiatric examiner necessarily makes some estimate of his patient's intelligence. Referral to a clinical psychologist for a more precise determination is often not feasible because of limitations of time or because such services are not available. As a result most psychiatrists are forced to resort to a variety of procedures which are without standardization and highly unreliable. Many examiners estimate intellectual level by asking a few questions on current events and a few problems in arithmetic. They depend for their comparative ratings on "subjective norms," which they have acquired through years of experience. Another method frequently employed consists in the selection of various easily administered items from widely used standardized tests of intelligence such as the Revised Binet or the Wechsler-Bellevue Intelligence Scale. This procedure is unsatisfactory not only because the results of an incomplete test are of doubtful value, but because the administration of isolated items may invalidate the future use of the complete test.

The test to be described here can provide a more reliable estimate of intelligence level than the procedures now employed by most examiners who have had no training in clinical psychology. The test has been standardized on adolescents and adults. It can be administered and scored in from 5 to 15 minutes. It is not offered as a substitute for the more precise instruments for measuring intelligence, which necessarily require more time and special psychometric training. What it does provide is a more adequate way of performing the intellectual appraisal which the psychiatrist himself must often undertake, within the limits of time that he can afford to devote to it.

Construction of the Preliminary Test of Intelligence

The P. T. I. in its final form as reported here consists of four brief sections, with the following numbers of items:

Vocabulary: 4 items.
Comprehension: 2 items.
Similarities and differences: 2 items.
Arithmetic: 3 items.

As some items can often be omitted, the test is even shorter than this list would suggest. The manner in which items may be omitted will be indicated when instructions for administering the test are presented.

The first step in the construction of the test was a decision as to the types of sub-tests to be included. It was considered desirable to have a variety of sub-tests, since the performance of a psychiatric patient often varies markedly from one type of item to another and the use of any single type might give a highly distorted estimate of his general intellectual level.

Five sub-tests were originally selected, through the following considerations. *Vocabulary* items were included because of the wide evidence that, for children and young

[1] From the Department of Psychiatry (School of Medicine) and Department of Psychology, Yale University.

adults they provide the most nearly adequate single measure of intelligence. *Comprehension* items were included in an effort to get some indication of what might be called "judgment" or "common sense." The ability to detect *similarities and differences* is presumably related in some way to the capacity for conceptual and abstract thinking. *Arithmetic* and *non-verbal* items were added because performance with this type of material is most frequently affected by organic brain disease.

The non-verbal sub-test, which was similar to the paper-cutting items on the Binet test, was by far the most lengthy portion of the test. The results of the standardization showed that the non-verbal section added very little to the efficiency of the other four sub-tests in predicting Wechsler-Bellevue scores. It was, therefore, omitted from the final form of the test. In the course of the standardization it became clear that the four remaining sub-tests would provide a satisfactory battery for our purposes, and they were all retained.

For most of the sub-tests, items were devised by the authors. The vocabulary items were selected at varying levels of difficulty from the vocabulary list published by Atwell and Wells(1). For each sub-test, more items were devised at first than were expected to be included in the final form.

Standardization Procedure

The purposes of the procedures used in standardization of the test were as follows:

1. To permit the selection of the most suitable set of items out of those included in the preliminary form of the test.

2. To establish standards for scoring responses to the items which are retained in the test.

3. To determine the relationship between performance on this test and on the Wechsler-Bellevue.

An initial step toward selection of items was made by giving this test alone to a group of about 40 hospital patients and students. The test was still left with more items than were eventually desired, however, and further reduction was left until evidence could be obtained from the main standardization.

The main standardization involved the administration of the P. T. I. to 150 persons for whom scores were also available on the Wechsler-Bellevue. This standardization group was diverse. The largest single group (92) was made up of patients in the psychiatric in-patient and out-patient clinics of the Yale University School of Medicine. Fourteen were bed patients on the general wards of the New Haven Hospital, 16 were counselees of the Vocational Counseling Service of New Haven, 14 were inmates of the Southbury State Training School for the Feeble-Minded and 14 were students, employees, etc. The standardization group was considerably more varied in intelligence than in the general population; for this reason, certain corrections will be made in some of the statistical results to be reported later. The ages also varied greatly, as indicated in Table 1.

TABLE I

Age Distribution of 150 Subjects used in Standardization

Age	No. of subjects
61-70	12
51-60	13
41-50	15
31-40	20
21-30	58
16-20	26
11-15	6

The tests were administered by several examiners in addition to the authors.[2] About half the subjects took the Wechsler-Bellevue test before taking the P. T. I., and about half took the P. T. I. first. The feeble-minded subjects at the state training school had taken the Wechsler-Bellevue about six months before, on the average. All other subjects were given the two tests at the same session or within a very few days of each other.

[2] We are greatly indebted to the following persons for their generous cooperation in administering the present test, or in supplying Wechsler-Bellevue scores: Marion Brody, Roderic Gorney, Ann Horton, R. W. McClure, Jr., Angela Quadfasel, Esther K. Sarason and Seymour Sarason. The cooperation of the New Haven Hospital, the Southbury State Training School and the Vocational Counseling Service of New Haven is greatly appreciated.

In the following paragraphs, the procedure and results will be discussed in connection with each of the three purposes of the standardization.

Selection of Items.—On the basis of results obtained during the standardization, certain items were eliminated and others retained. The criteria used in selecting the items to be retained were:

1. Ease and objectivity of scoring.
2. Differentiation in average Wechsler-Bellevue score between persons passing and failing the item.
3. Lack of ambiguity.
4. Range of difficulty within each sub-test.

By application of these criteria the items were reduced to the numbers specified above. The particular items used will be presented below in connection with instructions for administering the test.

Scoring Standards.—After a preliminary discussion of scoring standards, each response was scored independently by two of the authors. They then conferred about all the responses on which they disagreed or which either of them had marked as questionable. For each item in the final form of the test, standards were formulated which expressed the criteria to which the scoring conformed and which could be followed by another person. These standards, together with examples, are presented in the section on scoring. The same standards, which, of course are chosen arbitrarily, must be used in the scoring since the interpretations are based upon them.

Relation to Wechsler-Bellevue Scores.—For the 150 subjects used in the standardization, the correlation between the score on the P. T. I. and the total weighted score on the Wechsler-Bellevue test was +0.90. The magnitude of this coefficient would be misleading, however, if it were taken as representative of the general population, because our 150 cases were selected to have a disproportionate number of extreme cases, and this fact of course tends to inflate the correlation coefficient.[3] Two devices were used to estimate the correlation between the two tests for the general population.

1. The variability (standard deviation) of Wechsler-Bellevue total weighted scores for a sample of the total population, selected according to age in the same proportions as our sample, was estimated at 22.5.[4] We then determined the number of cases which must be removed from each of the more extreme score intervals in order to yield an approximately normal distribution with a standard deviation of 22.5. The appropriate number of cases was then removed at random from each score interval. There remained a sample of 104 cases. The correlation coefficient expressing the relation between the two tests was then computed directly for this sample and was found to be +0.74.

2. From our observed data and an estimate of 22.5 as the standard deviation of Wechsler-Bellevue scores for the general population, the correlation coefficient was estimated for the population by a conventional statistical formula;[5] the estimate so obtained was +0.79.

The value of this brief test for predicting Wechsler-Bellevue scores is, then, rather high. Our estimated correlation (between 0.74 and 0.79) compares quite favorably with values found in other published reports of the use of short tests to predict Wechsler-Bellevue scores. Lewinski(3) compared scores in the Kent Oral Emergency Test and the verbal battery of the Wechsler-Bellevue, for 290 "psychopathic and subnormal" naval recruits, and found a correlation of 0.73. In another study of 100 naval recruits, Lewinski(4) reports a correlation of 0.65 between Group A of the Herring Binet and the Wechsler-Bellevue Verbal Scale. Goldfarb, as cited by Wechsler(8, p. 134), examined 108 male adults and 60 female adults with the Otis Self-Administering (20 minute limit) and the Wechsler-Bellevue Full Scale, and correlations of 0.73 and 0.53 respectively, were found for these data. The exact values of these various correlation coefficients cannot meaningfully be compared, however, because of the probably differing variabilities of the samples studied.[6]

[3] For clarification of this point see, *e.g.*, Peters and VanVoorhis, pp. 208 ff.(5).

[4] This estimate was based on the data appearing in Table 14, p. 118, of Wechsler's manual(8).

[5] See Peters and VanVoorhis, formula 131, p. 210(5).

[6] Correlations from 0.76 to 0.97 have been reported(2, 6, 7) between selected combinations of subtests of the Wechsler-Bellevue and the entire

Correlations of this general magnitude mean that the prediction can be only very rough. We do not believe it wise to use this or any other short test as a basis for making a quantitative statement predicting an exact score on the Wechsler-Bellevue. The designation of broad categories is all that seems appropriate. Our recommendations about how this should be done will be presented in the section on the use of the test.

The Preliminary Test of Intelligence and Its Administration

The test should be administered in a situation which is as free as possible from distraction—preferably in a room alone with the subject. An examiner should at first record the responses verbatim, as it will be necessary to compare the responses later with the scoring standards in order to score them accurately. Recording should be as unobtrusive as possible and never in a situation where the subject may see what the examiner is writing. Later, when the examiner is experienced with the scoring standards, he may be able to score as the test progresses, without recording the responses. It may still be desirable to record certain responses because of an interest in their qualitative nature as well as their quantitative score.

Test questions may be repeated where requested by the subject; but the wording of the question should in no case be altered except as suggested in the detailed instructions below. Where the subject's response is ambiguous or when the examiner for some reason believes the subject capable of a better answer, the examiner may say, "Please explain further," or "Tell me more," etc. Such prompting should be given only once on any one test item.

Phrases have been suggested at the beginning of each test as transitions; if the examiner finds them awkward or unnatural, other such phrases may be substituted, but the test questions themselves should always be asked as they are printed here. Encouragement and praise should be given when it seems advisable. In general, the examiner should not indicate to the subject whether or not his responses are correct. Extraneous conversation should be limited as much as possible during the test administration.

Vocabulary

"Now first I'm going to ask you the meaning of some words. What does . . . . mean?" or *"What is a . . . . ?"* If any response is ambiguous, say, *"Please explain," "How do you mean?"*, etc., but give no further help. If two successive items are clearly failed, remaining vocabulary items may be omitted.[7]

1. Saucer. 2. Temperature. 3. Immune. 4. Infallible.

(1 point is allowed for each correct answer; the maximum score is 4. For scoring standards, see below.)

Arithmetic

"Now I'd like to ask you some arithmetic problems." If item 1 or 2 is failed, the remaining arithmetic items may be omitted.[8]

1. *"How much is 3 apples and 4 apples?"*
2. *"If a man drives his automobile 160 miles in 4 hours, what is his average rate of speed?"*
3. *"A man receives $20 interest from a savings account in the bank. If the rate of interest is 2%, how much money does he have in the account?"*

(2 points are allowed for each correct answer; the maximum score is 6.)

Comprehension

"Now tell me . . . ." If the response to the second item is ambiguous, say, *"Please explain," "How do you mean?,"* etc., but give no further help. The second comprehension question should be asked even if the first one is clearly failed.

1. *"Why do we wear clothes?"*
2. *"Where is the sun in the middle of the night?"*

(Each item is given either 0, 1, or 2 points. The maximum score is 4. For scoring standards, see below.)

Similarities and Differences

"I am going to name two things and I want you to tell me first how they are alike (or the same) and then how they are different." If on any item, the subject omits either the similarity or the difference, say, *"And how are they the same (or different)?"* If the subject cannot state a good

test in an effort to devise a "brief Wechsler." These correlations are irrelevant to our present purpose, which is the tentative prediction of Wechsler-Bellevue scores without necessitating the "using up" of any items on that test.

[7] Of the 150 persons in the standardization group, not one passed a later vocabulary item after having failed two of them.

[8] Of the 150 persons in the standardization group, not one passed a later arithmetic item after having failed an earlier one.

similarity for the first item, say, *"Well, when asked how they are alike you might say that a chair and a table are both used for eating, or that they're both made of wood, or that they're both pieces of furniture."* Give no further illustrations. The second item in this subtest should be asked even if the first one is clearly failed.

1. *Chair and table.*
2. *Pity and sympathy.*

(On each item, correct statement of a similarity receives 1 point, and correct statement of difference receives 1 point. Credit is to be given for correct statement of similarity even if statement of difference is wrong, and vice versa. The maximum score is 4. For scoring standards, see below.)

Instructions for Scoring the Test

VOCABULARY ITEMS

Each item is scored either 1 or 0.

1. *Saucer.*—Any response is accepted which either defines or gives a use of a saucer.

Examples of answers from the standardization group which were scored right: A dish. A plate. Thing that goes under a cup. Something to catch the coffee in. You drink something out of it. Part of a tea cup. You put salt in.

2. *Temperature.*—The answer must contain at least one of the following ideas: (1) degrees of heat (even if expressed so simply as "how hot it is"); (2) difference between hot and cold; (3) heat as a property of an object. Failure to mention one of these, or mention along with clear confusion with "thermometer" is scored as wrong.

Examples of right answers: Degrees of heat, different points of heat. How hot something is. When you are hot or cold. What we use to record heat, it is relative, hot or cold. The heat of something.

Examples of wrong answers: Warm, heat. Degrees. You see if it's cold, you have it outside the window in the winter time, see how cold it is. Heat temperature, body temperature, something up or down. Pertaining to heat. Is to do with your fever, how high or low it is; in sickness take your temperature and determine how ill you are. Two; for the weather and people take; have fever; weather; when it is cold or warm; means what people take for colds.

3. *Immune.*—To be scored as right, the answer must contain the idea of protection, safety or lack of susceptibility rather than mere absence of disease, etc.

Examples of right answers: Free from, not able to catch. To be protected from. Safe from contagion. Not susceptible to. If immune from anything, means you wouldn't get it. A person that can't catch a disease.

Examples of wrong answers: Don't get sickness or disease. Free from. Impossible to acquire. Nothing bothers you. Have no feeling for what is bothering you.

4. *Infallible.*—The answer must contain the idea of being incapable of erring or failing. The examples will indicate what a variety of specific ways of expressing this idea are acceptable. The examiner must particularly watch for a confusion between infallible and true, faultless, free from sin, or perfect.

Examples of right answers: Incapable of being wrong. Unerring. Doesn't fail. Something that is infallible is true, quality of it can't be denied; a test that's infallible is honest or known to work all the time. Person can't make a mistake.

Examples of wrong answers: Without error; not false. Can't be questioned. A certain tested doctrine or law that is proven valid. Practically perfect. Without fail. Person who seldom makes mistakes is infallible.

ARITHMETIC ITEMS

No credit is given on the arithmetic items for any response other than the correct answers of 7 apples, 40 miles per hour and $1000. Correct answers receive 2 points apiece.

COMPREHENSION ITEMS

Each of these items is given a score of either 0, 1, or 2 points.

1. *"Why do we wear clothes?"* One point is given for statement of any acceptable reason. Two points are given if two or more kinds of reasons are given, out of the three kinds listed below. If two or more of the reasons are given and they are all of a single kind, only one point is allowed.

Kinds of right answers, with examples:

(1) For protection: Use them against the elements of nature. To keep warm. To protect you from the sun. Keep dust and germs off.

(2) For modesty, or because demanded by custom: To cover our nakedness. To protect nudeness. We are ashamed. Demanded by the mores. Wouldn't be nice if you went around outside all naked.

(3) For adornment: Looks. To get dressed up.

Examples of answers scored zero: Somebody will see what we look like. Because of laws of nature; (?) because everyone else does; if we didn't we would go against laws of nature. Just tradition that started and we keep wearing them. Because it's the civilized way; also have to wear clothes; (?) because couldn't go without; it's just a . . . . I can't explain. To cover up ourselves. It's human nature to wear clothes; it's the thing to do; (?) thing we have been doing all our lives. Because we don't want to be naked and we don't want to die from hunger and thirst. (Spoiled)

2. *"Where is the sun in the middle of the night?"* An answer is scored 2 points if it includes the idea that the sun remains in the same place (even if it also includes the erroneous statement that the earth revolves around the sun in 24 hours). Lacking this idea, an answer is scored 1 point if it indicates *clear* understanding that the sun is shining on the opposite side of the earth (or some specific place there).

Examples of answers scored 2: On the other side of world; always in one spot; seems to move.

Just where it is during the day time. We say it has traveled into shadow of earth, other side, earth goes around sun, actually sun is in same place; earth in 24 hours turns around so when we see sun merely means we have turned so much.

Examples of answers scored 1: On the opposite side of world. Sun is directly below our zenith. About right down under and half way round the world. China.

Examples of answers scored 0: Some other part of the earth I guess. I haven't found out; somewhere beyond the horizon; on the other side of the earth. Must be down. Sun goes down and moon comes up; (?) beneath earth. Oh, might be over in China; it doesn't stay in one place; stays here in day and over in China in night time. Sun revolves and goes down in west and up in east in morning; revolving around earth.

SIMILARITIES AND DIFFERENCES

Each similarity and each difference is scored either 1 or 0, so that the maximum score is 4.

1. *Chair and table.*

a. Similarity: Any general or concrete statement of a respect in which a chair and table are similar (*e. g.*, form, purpose, material, classification) is scored correct, even if only approximately accurate.

Examples of right answers: Both needed for eating dinner. Both have legs. Both made of wood. Both furniture.

Examples of wrong answers: Legs might be alike. Belong to each other. Both members of a set. Not alike. Alike in that they are both usable. Could be same color or style of furniture.

b. Difference: 1 point is given for any general or concrete statement of a respect in which chair and table are different (*e. g.*, purpose, form), except qualitatively inferior or false contrasts such as are listed below as examples of wrong answers.

Examples of right answers: Chair, sit on; table don't. Eat off table; sit on chair. Different because one is used to sit personal self on, other is used to sit dishes, etc. on. One's to sit in and the other is to put ornaments on.

Examples of wrong answers: Chair you sit on to be near table. One higher than the other, table higher. Table much bigger than chair. Have a different shape. One has a back, one has a top. One has a back and legs, other just a top and legs. Difference is a chair's a chair, a table's a table.

2. *Pity and sympathy.*

a. Similarity: Any explicit generalization that is at all reasonable is scored as correct.

Examples of right answers: Both emotions, sentiments, directed by one individual toward another. Both mean to be sorry. Feeling for someone, any feeling. Both emotions of one toward a sufferer. Have kindly feelings both excite feeling of kindness and interest in assisting. Alike in a feeling way. Bestowed upon another's welfare or misfortune. Both taking an interest in someone else.

Examples of wrong answers: Means of comforting. They're different. Naturally we have sympathy; one follows another. When you have pity for anybody, you sympathize with them; if they did something that wasn't right you would pity them; if they did something to somebody else you would sympathize.

b. Difference: Any of three points are accepted as correct in making this differentiation: (1) Pity involves contempt or feeling of superiority, etc. (2) Sympathy involves more empathy or greater participation with another person. (3) Sympathy may be in response to the pleasure as well as the pain of another person.

Examples of right answers: Pity stronger than sympathy; you can be in sympathy with a person even if it's a pleasure; in pity, some misfortune has occurred. Pity connected with contempt; whereas sympathy may imply respect. To pity someone is to be sorry for them, to sympathize with someone is to be sorry with them. Pity is an emotion directed at a person; sympathy is an emotion shared with a person. Different in that in one we have compassion, understand his feelings; pity we feel sorry for, superior to, with compassion.

Examples of wrong answers: Pity is really not personal; sympathy is more personal. Sympathy is sincere interest in other's welfare; pity, you thank God it's not you. When you pity a person, you have some kind of disgust in it; sympathy is something on a higher plane.

When answers to various test items are not clearly "right" or "wrong" by these scoring standards, the examiner must use his judgement.

INTERPRETATION AND CLINICAL APPLICATION

The proper use of any rapid method of determining intellectual status, as we have already indicated, is confined to assigning a patient to one of several broad categories We have chosen four categories: above average, average, below average, and markedly below average. The user of the test should, in his own mind, prefix "probably" to each of these labels, for with a brief test it is of course impossible to attain the degree of certainty that may be possible with a long test.

In order to assign a patient to one of these four categories on the basis of the P. T. I., the norms given in Table II should be used. In consulting these norms the patient's age and his total score on the brief test are all the information needed. The table then gives the interpretation. In the age range from 17 to 29 years, for example, a score of 11 would indicate average performance and a score of 4 would indicate markedly below average performance.

It will be noted that, because of changes with age in test performance, the interpretation of any given score may vary according to the age of the patient. For example, a score of 7 is interpreted as below average if achieved by a person in the 17-29 or 30-39 age groups, but is interpreted as average in the older age groups. Similarly, a score of 12 is interpreted as average for persons of 49 years or younger, but as above average for those of 50 years or older.

These norms are referred to as "tentative" because as more data becomes available, they may be slightly changed. We believe them to be the most satisfactory norms possible on the evidence obtained from the 150 cases in the standardization group. In order to show how well the interpretation of scores on the P. T. I. corresponds with Wechsler-Bellevue I. Q.'s, we have exhibited the relationship, for our 150 cases, in Table III. Considering the general fallibility of predictions based on very brief tests, we believe these results are highly satisfactory.

There are obvious limitations to the use of any brief test of intelligence. It would be unjustified, for example, to make a clinical diagnosis of feeblemindedness on the basis of this test alone. Because of its highly verbal content, it will not be useful with individuals with aphasic or other language difficulties. The test will also not be useful in situations where fine discriminations of differences in ability are required or where interest is centered in mild disturbances of intellectual function. In many cases, however, the psychiatrist is not interested in whether his patient has an I. Q. of 100 or 110. He may merely wish to know whether or not his patient's intelligence is significantly above or below average. In such cases this test offers a more reliable index than the usual non-standardized methods.

The test may also prove useful as a screening device for selecting those patients who should be referred to a clinical psychologist for a more thorough examination.[8]

TABLE II

TENTATIVE NORMS FOR THE INTERPRETATION OF SCORES ON THE PRELIMINARY TEST OF INTELLIGENCE

Age	17-29	30-39	40-49	50-59	60-69
Above average	13 or above	13 or above	13 or above	12 or above	12 or above
Average	9-12	8-12	7-12	6-11	5-11
Below average	7-8	6-7	4-6	3-5	2-4
Markedly below average *..	0-6	0-5	0-3	0-2	0-1

* The interpretation of scores in this category will vary according to other information available about the subject. Scores this low might be due to feeblemindedness, psychological deficit, inability or refusal to cooperate, etc.

TABLE III

DISTRIBUTION OF WECHSLER IQ RATINGS WITHIN EACH CLASSIFICATION OF SCORES ON THE P.T.I.

I. Q.	Above average	Average	Below average	Markedly below average
135-139.....	2	..	..	..
130-134.....	3	..	..	..
125-129.....	9	..	..	..
120-124.....	6	3	..	..
115-119.....	11	3	..	..
110-114.....	8	5	1	..
105-109.....	4	11	..	..
100-104.....	3	13	..	..
95-99	..	10	..	..
90-94	..	7	2	..
85-89	..	2	3	..
80-84	..	4	2	2
75-79	..	..	3	2
70-74	..	..	4	1
65-69	..	..	2	4
60-64	..	..	1	6
55-59	..	..	..	3
50-54	..	..	..	1
45-49	..	..	..	2

[8] It is interesting in this connection that one item of the test seems unusually successful in screening out subjects who are not below average in intelligence. According to these results, any subject who can successfully differentiate between pity and sympathy (according to the standards of scoring which have been described) is almost certainly not below average in intelligence and is probably above average. Of the 17 people in our group who succeeded with this item, none had Wechsler-Bellevue I. Q.'s below 111. Ten of the 17 had I. Q.'s above 120. Failure to succeed with this item does not mean, of course, that the individual is in any way deficient in intelligence; among our subjects with I. Q.'s of 111 or higher, there were 33 who did fail on this item.

If the results of the brief test indicate that the patient's intelligence is probably average, there may be no need for referral for a more complete examination unless the test results are at variance with the psychiatrist's clinical impression. Patients who receive scores which are below average might be routinely referred to a clinical psychologist. Deterioration of intellectual function, of course, cannot be reliably determined by this test. Any marked discrepancy between ratings on this test and capacity indicated by the patient's occupational and educational history and by other aspects of his behavior, should probably be considered cause for referral for a more thorough check on the possible presence of deterioration.

Qualitative analysis of the subject's response is often useful in psychiatric evaluation. Such analysis may be made of the responses to these questions just as well as of the responses to unstandardized questions. During the administration of the test it may be possible, for example, for the experienced clinician to make observations on attention-defect, preoccupation, lack of confidence, self-deprecatory trends, etc.

The test should prove useful to examiners for whom psychological service is not available. In this situation, it should be supplemented with other information which may be indicative of intellectual level, namely: school record, educational level achieved and occupational status.

Summary

A brief test of adult intelligence designed for psychiatric examiners is reported. The test (Preliminary Test of Intelligence) consists of vocabulary, comprehension, similarities and differences, and arithmetic items and can be administered and scored in 5 to 15 minutes. Preliminary standardization data on 150 subjects ranging in age from 11 to 70 years show satisfactorily high correlations with the Wechsler-Bellevue Intelligence Scale. The test, together with complete instructions for administration, scoring and interpretation is included in the text. Tentative norms permit the classification of intelligence level in one of four categories: above average, average, below average and markedly below average. The I. Q. range within each category for the standardization group is reported.

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AN EXPERIMENTAL STUDY OF MENTAL PATIENTS THROUGH THE AUTOKINETIC PHENOMENON

ALBERT C. VOTH, PH. D.,[1] TOPEKA, KANS.

Markedly wide differences among persons have been found in the autokinetic phenomenon. In previous reports(15, 16) the writer has offered the suggestion of using this phenomenon as a projective measure of differences in personality structure. In this paper the application of this method in personality testing is presented to show some diagnostic and prognostic possibilities in mental cases.[2]

The phenomenon is visual in character and can be observed readily by looking at a stationary pin-point light from a short distance, and for a period of time, in an otherwise totally dark room. It manifests itself by multi-directional movement of the small light, varying in course, extent and speed. Maximumly, the movement may appear so extensive that its recording by the subject on a large graph board may extend from border to border. Some individuals see only limited movement, while some see none. The extent and pattern of movement is fairly constant for a given person. Retests of 25 or more normal subjects have shown a rank difference correlation of +0.96 as measured by indices later to be described. Although mention of the autokinetic phenomenon is seldom found in current text books on psychology and related subjects, scientific investigation of it as an interesting psychological reaction dates back a considerable number of years. Charpentier(6), Exner(7), Aubert(2), and others were among the earlier investigators. More recently Carr(5), Adams(1), Hovland(9), Guilford and Dallenbach(8), Schilder(14), Sherif(12, 13), Haggard and Rose (10), Kleint(11) and others have given it attention. Theories regarding the illusion have varied rather widely, ranging from explanations centering around local eye functions to those emphasizing extensive body tensions and body tonus, with central functions predominating. Kleint believes to have found autokinesis, not only in the visual sense but also in the auditory and tactual fields. Thus far causal explanations have not progressed beyond the theoretical stage, and remain so in our investigation. The theories of local eye functions have, however, been generally discarded for those emphasizing central mechanisms.

In using autokinetic movement as a means of studying personality traits the theoretical assumption is made that through this subjectively induced mode of perception characteristic personal differences can be revealed in respect to the form in which reality orientations occur in the general cognitive activities of the individual. Unlike some projective tests, content is not expressed through autokinetic movement. This, it would seem, serves the useful purpose of arriving at a relatively pure or simple form of perception without the modifying effects of extraneous material. Applying this technique to mental patients the assumption is made that, inasmuch as syndrome differences are known to be related to personality differences, various forms of autokinetic reactions can be expected to furnish useful diagnostic pointers, and supplement and further verify the findings of diagnostic tests already in use.

EXPERIMENTAL PROCEDURE

Tests were given to 845 patients. Of these, 13 were patients at the State Epileptic Hospital at Parsons, Kansas, and 91 were resident patients at the Menninger Clinic.[3] The data obtained in the Topeka State Hospital have come mainly from newly arrived acute patients who were tested as soon as feasible.

[1] Psychologist, Topeka State Hospital, Topeka, Kansas.

[2] Some preliminary summary accounts of the present investigation have been given in the biennial reports of the Topeka State Hospital of 1940, '42, and '44.

[3] The writer is greatly indebted to Dr. Karl Menninger and Dr. W. C. Menninger and their staff for their helpfulness in making possible some of the earlier portions of this study at the Menninger Clinic.

Chronic patients were used whenever necessary to expand evidence in some particular class of disease. The ages of subjects ranged from 14 to about 70 years. The investigation covers approximately the past seven years, though some of the preliminary work at the Menninger Clinic dates to several years earlier. This coverage in time has afforded the opportunity to gain longitudinal as well as cross-sectional views of the courses the diseases of tested patients have taken. Fifty-four patients were retested to determine the reliability of the test, and 100 patients receiving metrazol shock treatments were retested periodically to determine whether changes in autokinetic perception occur under shock therapy.

APPARATUS AND TEST PROCEDURE

The equipment consists of a small light-tight box, approximately $7'' \times 9'' \times 7''$, containing a bulb of low wattage suitable for 110 volt current. There is a small pin-point aperture, 1 mm. or less, at one end of the box which can be covered with some red tissue to reduce the intensity of the light. For recording purpose a large graph board is supplied, $22'' \times 28''$ in size. Any clear sheet of paper the size of the board serves as a recording sheet. The paper is held in place by small nails protruding from the rim of the board over which is placed a wooden protective frame about $1\frac{1}{2}''$ in width, and in all the same size as the graph board. A shield is placed in front of the stand on which the light box is mounted to conceal its construction.

During the ten minute test period, the patient sits at a small table provided for the graph board, and about ten or twelve feet from the light, and directly facing it He is told that the test will be ten minutes in length, that the room will be dark but the door not locked, and that the person giving the test will stand outside to keep time. He is told to hold his pencil in readiness at the center of the board, to keep his eyes constantly on the light during the test period, and to hold his head as steady as is comfortable. He is further instructed that if the light begins to move he is to move his pencil around on the board in the directions and at the same speed the light goes, and to continue as long as the light moves. Each time movement stops a heavy dot is to be recorded and then movement continued from there when it occurs again. Intentional returns to center are to be made only when movement happens to lead out of bounds against the frame at the edge of the board. Such returns are to be made by raising the pencil back to a guessed center. The patient is clearly instructed not to move his pencil as long as he sees the light in a stationary position straight ahead. For best results it must be emphasized that the test room be totally dark to avoid visibility of anything which might serve as an orientation pattern with the light. Keyholes, doors and windows must be completely checked for possible light infiltration. With psychotic patients the exact manner of giving instructions must necessarily vary a little, depending on the individual. With some it becomes necessary to be very specific as to direction on the charting board—"up," "down," "to the left," etc., and to insist that stops, if they occur, be recorded by a heavy dot, and not merely by a pressure of the pencil. Obviously, disturbed or very confused or deteriorated patients cannot be tested. None of our patients has become violent or destructive during the test performance. With some patients receiving shock treatments and who were non-cooperative at first, good test results were obtained after the first few shocks had been given. After each test it has been the practice to question the patient briefly to verify that he had understood and performed the test correctly. Fear of the dark room is much less frequent than might be expected—only a very few have expressed such fear.

GRAPH PATTERNS AND MEASUREMENTS

Autokinetic movement assumes a great variety of patterns. Where only small amounts of movement occur the action may be for only a brief interval of time, or it may be sporadic, frequently interrupted by stops. Some movement can be described as erratic, showing many reversals of direction; very irregular distribution of stops; unexpected sudden runs possibly interrupted, then, by unusually long stops; repeated running out of bounds; and pendular-like hor-

izontal swings, with stops usually occurring at the extremities of the movement. In cases where such horizontal swings occur it has not infrequently been found, both among normal subjects and patients, that there is a left hand dominance or a history of handedness reversal. Also more frequently associated with such swinging movement patterns is stammering, active at the time, or a history of such speech difficulty. Where extensive movement is seen stops as a rule become less frequent and the path of movement often assumes long sweeps with less directional changes. Individuals capable of experiencing extensive movement also often have the ability to voluntarily control its direction. Such ability becomes less frequent among those limited to less extensive movement.

In an earlier paper(16) a more detailed account and rationale of the method of graph measurements was given. The essentials are here summarized: An index figure is calculated for each test record to provide a simple convenient basis for comparing individual differences. In comparing autokinetic records in our preliminary studies with established personality tests, mainly Rorschach, the best differentiations of personal differences could be obtained, not only through the measurement of the length of the path of movement, but also by taking into consideration the maximum expanse of the graph; the maximum deviation from center; and the number of stops occurring in the course of the movement. The formula used for calculating the index of a graph is:

$$\sqrt{\frac{L \times DC \times ME}{(S+1)}}$$

in which L=the total length of path of movement: DC=maximum distance attained from center; ME=maximum expanse of the graph, that is, the distance between the two points farthest apart in the graph, and S=the number of stops. All linear measures are in centimeters. Since stops may be viewed as a psychological reciprocal of movement their number (S) was used as the denominator in the formula with the integer 1 added to insure a denominator. (As a practical mathematical procedure, where a metric rule is not available, linear measurements can be done in inches and then the final index figure, as obtained by the above formula, multiplied by 4 to equate with indices arrived at through metric measurements.)

Experimental Findings

diagnostic aspect

Reference to Table 1 will show autokinetic indices listed in a two column arrangement, according to greater and lesser movement, as they relate to various psychiatric syndromes. For the more common psychoses and neuroses, where fairly sufficient numbers of cases were tested, histograms, Figs. 1 to 3, and 5 to 8, are presented to show detailed distribution of indices. Fig. 4 shows distribution of indices in the normal population. Since indices are arranged in the histograms in steps of five an asterisk has been used in the first column to distinguish the number of zero indices (no movement) from those indicating the small extent of movement recorded in the first step. The index figure 10, used in Table 1 to differentiate greater from lesser movement was empirically chosen as approximating the most consistent and regular point of demarcation between the autokinetic performance of manic-depressive patients and the various types of schizophrenics, as also between the conversion hysterias on the one hand and those with other forms of neuroses (psychasthenia, neurasthenia, mixed neuroses, and anxiety neuroses).

Distinct group differences in autokinetic reactions are evident from the distribution histograms and from the figures in Table 1. The manic-depressive group has a notably larger percentage of no-movement reaction than schizophrenics, and patients with conversion hysteria give, on the average, distinctly different reactions from those found in other listed forms of neuroses. Among those exhibiting tendencies toward lesser or no movement are also to be found the involutional psychoses, the psychoses due to cerebral arteriosclerosis, paretics and alcoholics. In contrast, epileptics trend markedly in the direction of movement. It is of special interest that the paranoid schizophrenias represent the only clinical group in which a 50-50 distribution is found.

Chi ^{2} computation of the differences be-

tween all manic-depressives and all schizophrenics in Table 1 shows Chi ^{2}(d.f.=1) =69.8, with a significance of $<<<1\%$. A similar Chi ^{2} comparison between conversion hysterias as one group and the other neuroses of Table 1 gives Chi ^{2}(d.f.=1) =21, with a significance of $<<1\%$.[4]

One of them showed pronounced change in reduction of movement, the others remained approximately the same.

ATYPICAL CASES

The method used to gain some added information on cases exhibiting atypical auto-

TABLE 1

DISTRIBUTION OF AUTOKINETIC INDICES AS TO CLINICAL TYPES

Diagnosis by staff	Number and percentage of cases				Totals
	Indices 0 to 10		Indices above 10		
Manic-depressive, manic*	88	74 %	31	26 %	119
Manic-depressive, depressed*	107	72.8%	40	27.2%	147
Manic-depressive, mixed type*	9	82 %	2	18 %	11
Involutional melancholia	19	82.6%	4	17.4%	23
Involutional paranoia	5	83 %	1	17 %	6
Catatonic schizophrenia*	34	29.3%	82	70.7%	116
Hebephrenic schizophrenia*	14	37 %	24	63 %	38
Paranoid schizophrenia*	27	50 %	27	50 %	54
True paranoia	3	100 %	0	0	3
Paranoid condition	3	60 %	2	40 %	5
Simple schizophrenia	3	30 %	7	70 %	10
Unclassified and mixed schizophrenia	6	54.5%	5	45.5%	11
Epilepsy	3	14.3%	18	85.7%	21
Paresis	27	62.8%	16	37.2%	43
Psychosis with cerebral arteriosclerosis	17	100 %	0	0	17
Conversion hysteria*	35	77.7%	10	22.3%	45
Psychasthenia*	5	23.8%	16	76.2%	21
Neurasthenia*	2	20 %	8	80 %	10
Anxiety neurosis*	3	37.5%	5	62.5%	8
Mixed neurosis*	3	43 %	4	57 %	7
Psychopathic personality	10	58.8%	7	41.2%	17
Alcoholics*	32	61.5%	20	38.5%	52
Psychosis with mental deficiency	7	77.7%	2	22.3%	9
Psychosis due to metabolic, endocrine, etc., disturbances	9	75 %	3	25 %	12
Essential hypertension	5	83.3%	1	16.7%	6
Unclassified psychosis	21	61.7%	13	38.3%	34
Totals	497		348		845

* Please see histograms, Figs. 1 to 8, for complete details of indices distribution.

TEST RELIABILITY

Retests of 54 patients chosen at random and compared with original indices by the rank difference method produced a correlation + 0.92. (See Fig. 9.) These retests were given without intervening shock treatment, and some of them as much as a year or more after the first test. Under shock administration radical changes sometimes occur in autokinetic movement. This will be discussed later. Among normal subjects a few test records have been obtained in retests as much as 8 to 10 years after the first tests.

[4] A percentage significance of 1 or <1 means that there is only one, or less than one, chance in a hundred that the obtained experimental difference could have arisen by chance.

kinetic characteristics in a given clinical classification was to study the detailed diagnostic opinions of individual staff members. It was found, first, that when only cases were considered in which unanimous diagnostic agreement existed in the staff autokinetic indications became more typical for a given clinical category. To cite a few instances; instead of the 74% for manics in Table 1, an 81% was obtained. Percentages in depressions and involutional melancholias were similarly increased. Catatonics increased from the 71% in the table to 83%—hebephrenics similarly; conversion hysterias, 78% to 94%, etc. In general such increases ranged from 5% to approximately 15% in favor of the typical trend of the test findings. Grossly,

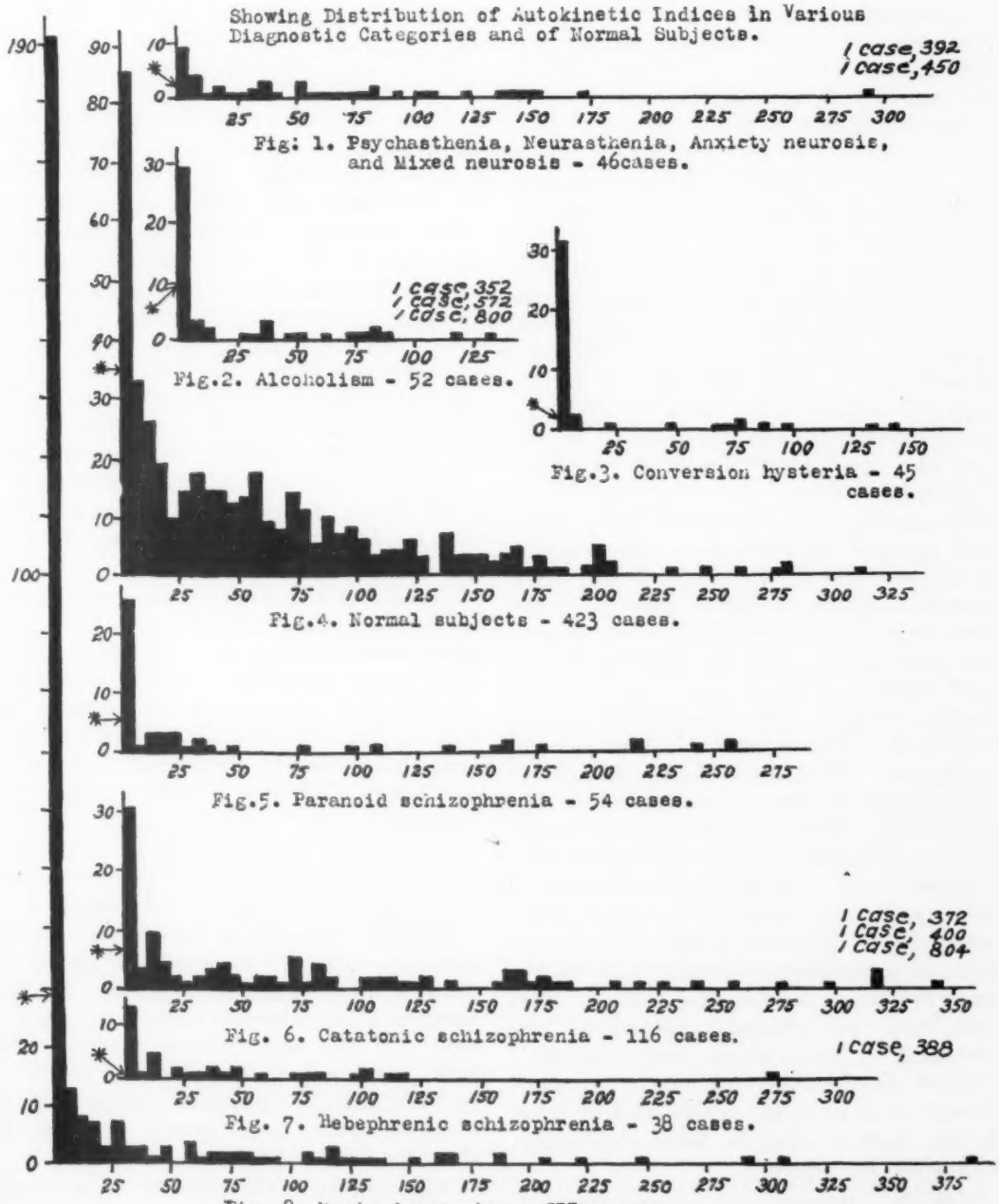
Showing Distribution of Autokinetic Indices in Various Diagnostic Categories and of Normal Subjects.
1 case, 392
1 case, 450
1 case, 352
1 case, 572
1 case, 800
1 case, 372
1 case, 400
1 case, 804
1 case, 388

Fig. 1. Psychasthenia, Neurasthenia, Anxiety neurosis, and Mixed neurosis - 46cases.

Fig.2. Alcoholism - 52 cases.

Fig.3. Conversion hysteria - 45 cases.

Fig.4. Normal subjects - 423 cases.

Fig.5. Paranoid schizophrenia - 54 cases.

Fig. 6. Catatonic schizophrenia - 116 cases.

Fig. 7. Hebephrenic schizophrenia - 38 cases.

Fig. 8. Manic-depressive - 277 cases.

Number of cases indicated on the ordinates; autokinetic indices on abscissas.
Indices listed above the asterisks are zero (0).

diagnostic unanimity of the staff, as a rule, progressively increased as the typical (typical in autokinetic reactions) end of the distribution curve for a given clinical category was approached. Thus, *e. g.*, in Figs. 3 and 8, for hysteria and manic-depressives, there was greater unanimity of opinion at the positive or zero end of the curve than where indices were higher. In Figs. 5 and 6, for paranoid and catatonic schizophrenia, this was reversed.

In addition to comparing distributions of indices with unanimous diagnostic expressions of staff members it was found fruitful to consider dissenting or minority opinions as well. It was discovered that among those paranoid schizophrenics who saw little or no autokinetic movement (indices 0 to 10), but, who, as schizophrenics might have been expected to register movement, 29% were designated as manic-depressives by minority staff opinion. In contrast to this only 8% of the paranoid schizophrenics seeing more extensive movement (above index 10) were thus designated as manic-depressives. A similar condition prevailed for catatonics—39% with indices 0 to 10 were voted manic-depressives by a staff minority, while only 10% with higher movement indices were so designated. There was a similar, though not so pronounced, minority expression for hebephrenics. When manic-depressives were examined from the point of view of minority judgments the relatively few who exhibited movement above index 10 received a somewhat greater diagnostic designation of some form of schizophrenia—notably catatonia—than did those showing low indices. Also such terms as "schizoid personality," "unclassified," "unclassified schizophrenia," "mixed manic-depressive" and "psychasthenia" were more frequently used by some in the staff to describe manic-depressives exhibiting movement.

Suicide attempts are more prevalent among manic-depressives with zero indices, and such attempts are nearly always of a forthright nature. The few who have succeeded in their attempts while in the hospital, and from whom tests had been obtained, all had shown zero indices. This pertains to the involutional melancholias as well. The impression has been gained that among the depressives registering movement suicidal attempts are more often half-hearted and indirect, or more talked about than done.

PROGNOSTIC INDICATIONS

Early in the course of this study it became apparent that recoverability of patients seemed to have some categorical relationship to autokinetic propensities. A longitudinal view, extending over the past seven years or more, has shown that patients exhibiting only limited autokinetic movement present, in the aggregate, the best remission records, with even some disregard of the forms of psychoses involved. The delineation of this favorable group seems best expressed through indices 1 to approx. 50. The criteria for judging recoverability were paroles and restorations. Upon sufficient recovery patients at the Topeka State Hospital are at first paroled and then, after a lapse of a few months to a year or more are granted a restoration if their mental conditions warrant it. A "restoration" represents the more rigorous criterion of recovery. Table II shows some major clinical groupings in relation to conditions of recovery and autokinetic indices. (Under "paroled" are listed all patients who have at some time during this investigation merited a release from the hospital.[5])

The general trend of Table II, with a few exceptions, demonstrates the more favorable prognostic weight that may be attached to a moderate showing of autokinesis. Either extreme—extensive movement or no movement whatever—seems to presage, on the average, a less favorable outlook for the patient. Of the two extreme reactions the latter presents the better record of recovery. In Table III Chi ^{2} computations for some of the numerically larger groups of Table II show the following:

Although neurotic patients as a whole have a slightly better restoration rate in the highest movement bracket, Chi ^{2} gives the figures for this group a relatively low sta-

[5] Table II gives the account of patients at the Topeka State Hospital only. The terms here used as criteria of recovery were not clearly applicable to the release procedures at the Menninger Clinic; therefore the cases from that institution have not been included in this section.

TABLE II

SHOWING RELEASES AND RESTORATIONS OF PATIENTS WITH VARIOUS AUTOKINETIC CHARACTERISTICS

	(Paroles)						(Restorations)					
Autokinetic indices	0		1 to 50		Above 50		0		1 to 50		Above 50	
Clinical categories	* / †	%	* / †	%	* / †	%	* / †	%	* / †	%	* / †	%
All cases tested.	353 / 235	66.6	225 / 186	82.6	176 / 121	68.7	353 / 124	35.1	225 / 109	48.4	176 / 57	32.4
Manic-depressive, shock treatment.	51 / 46	90.2	24 / 24	100.	14 / 11	78.6	51 / 34	66.6	24 / 18	75.	14 / 8	57.
Manic-depressive, no shock.	103 / 79	76.7	46 / 44	95.6	21 / 18	85.7	103 / 41	40.	46 / 27	58.7	21 / 7	33.3
All schizophrenics, shock treatment.	32 / 24	75.	44 / 34	77.2	49 / 31	63.2	32 / 10	31.2	44 / 27	61.3	49 / 16	32.6
All schizophrenics, no shock.	27 / 9	33.3	23 / 13	56.5	34 / 15	44.1	27 / 2	7.	23 / 4	17.4	34 / 6	17.6
Catatonic schizophrenia, shock.	21 / 16	76.2	24 / 20	83.3	35 / 22	63.	21 / 8	38.	24 / 16	67.5	35 / 11	31.4
Catatonic schizophrenia, no shock.	6 / 2	33.3	8 / 5	62.5	20 / 9	45.	6 / 1	16.6	8 / 4	50.	20 / 3	15.
Paranoid schizophrenia, shock.	6 / 3	50.	10 / 7	70.	6 / 4	66.6	6 / 2	33.3	10 / 6	60.	6 / 2	33.3
Paranoid schizophrenia, no shock.	13 / 4	30.7	6 / 3	50.	7 / 3	43.	13 / 1	7.	6 / 0	0	7 / 0	0
Hebephrenic schizophrenia, shock.	4 / 4	100.	8 / 5	62.5	6 / 5	83.3	4 / 0	0	8 / 4	50.	6 / 3	50.
Hebephrenic schizophrenia, no shock.	8 / 4	50.	6 / 2	33.3	5 / 1	20.	8 / 0	0	6 / 0	0	5 / 1	20.
Paresis.	21 / 6	28.	12 / 7	58.	10 / 7	70.	21 / 2	9.5	12 / 2	16.6	10 / 2	20.
Conversion hysteria.	29 / 25	86.2	4 / 4	100.	8 / 8	100.	29 / 16	55.2	4 / 2	50.	8 / 5	62.5
Psychasthenia, neurasthenia, anxiety, and mixed neuroses.	1 / 1	100.	14 / 12	85.7	15 / 12	80.	1 / 1	100.	14 / 5	35.7	15 / 7	46.6
Alcoholics.	12 / 12	100.	10 / 10	100.	6 / 6	100.	12 / 7	58.3	10 / 7	70.	6 / 3	50.

* Total number of patients tested in the given category.
† Total number of patients paroled or restored in the given category.
NOTE—Only metrazol was used for shock treatments.

TABLE III

DIFFERENTIAL SIGNIFICANCE OF DISTRIBUTION OF CASES DERIVED FROM TABLE II

Groups compared	Indices, (0) : (1 to 50) : (above 50)	
	Chi^2 (d. f. = 2)	Significance
Paroled : Not paroled (all cases tested)	18.5	< 1%
Restored : Not restored (all cases tested)	14.4	< 1%
Restored : Not restored (all manic-depressives)	6.3	2 — 5%
Restored : Not restored (all schizophrenics)	9.5	1%
Restored : Not restored (all neurotics)	1.4	30 — 50%
Paroled : Not paroled (paretics)	5.6	5 — 10%

tistical significance. Paretics elicit some special interest in that, despite the organic involvements, patients with autokinetic propensities of any degree apparently weathered the disease better than those displaying no movement whatever. This has been shown in a higher percentage of paroles of the former group and also in the fact that patients with zero indices had, as a rule, much longer histories of hospital residence. This is not to say that there were also such group differences in the serological findings—only psychological symptoms necessitating hospitalization are here considered.

An appraisal of the degree of chronicity of tested patients remaining in the hospital and those who have returned has shown that again those with medium indices present a better picture. More such patients than any others have been able to do some useful work on the wards or on the grounds, and participate in entertainments, whereas, the highest percentage of severe chronicity with accompanying deterioration and inability to perform any integrated activity was found among patients at one time showing extensive autokinetic movement.

Further prognostic inferences can be directly drawn from the patterns of autokinetic graphs, although their detailed significance cannot as yet be stated. It has already been mentioned that some patterns are more erratic than others, and these have been described in the section on graph patterns and measurements. In the major psychoses a comparison between restored patients and those remaining in the hospital or on protracted parole revealed that the restored group had a definitely smaller percentage of patients originally exhibiting erratic movements of various kinds. A similar comparison in the schizophrenic groups alone, where only the number of directional changes of movement were considered, showed an average of 11.3 changes for the restored group as against an average of 18.6 changes for the unrestored patients. The critical ratio for this difference was 2.65, indicating a fairly reliable difference. (A change of direction in movement was counted where the angle was approx. 90 degrees or less). It is worth noting, incidentally, that epileptics ranked highest in all psychotic groups in the number of directional changes of movement—average 30.6. The limited number of epileptics tested, however, did not warrant critical comparisons with other groups.

AGE AND SEX DIFFERENCES

In the normal population age seems not to be of great importance in respect to the amount of movement a person sees. This was clearly shown when approximately 275 indices, obtained from the general population representing all ages, were later added to the distribution histogram of 149 indices obtained from predominantly young people of college age. The addition showed pronouncedly uniform increases in practically every step of the original distribution curve. In patients the age differences occurred somewhat according to diagnostic groups. There was, *e. g.*, a higher age level in manic-depressives than in schizophrenics, especially among first admissions, as could be expected from psychiatric knowledge. Within a particular group, however, age differences seemed not to be of great importance in the distributions of indices. In the aggregate women are prone to see less movement than men. Table IV illustrates this.

THE EFFECT OF SHOCK THERAPY

When patients who ordinarily perceive movement are given a series of shock treatments they not infrequently show very distinct reduction in movement upon retest, sometimes to the zero point. The number of shocks necessary to effect such reduction varies with individuals. As a rule a patient who does not see movement before shock, still records no movement after shock administrations. Retests were usually done a day or so after shock was given to avoid as much as possible residuals of mental confusion that might linger after shock. The cases here reported all received metrazol. Recently we have had the opportunity to observe patients treated by electroshock, and believe to find similar reductions of movement taking place under such form of treatment.

Fig. 9 shows test and retest indices of a control group of 54 patients chosen at random but not receiving shock. The 100 patients whose indices are recorded in Fig. 10

received shock treatments, varying in numbers. The tendency for movement to reduce upon shock is readily seen from a comparison of A and B in Fig. 10. No such pronounced reduction is noticeable in Fig. 9. In Fig. 10, B, a thinning out of indices after shock is noticeable in the area found, in our previous discussions on prognostic indications, to be the most unfavorable for recovery, namely the area of high indices. Against this, indices clustered more, after shock, in the more favorable areas of lower indices. For a given patient the relationship between recovery and reduction of movement tends to be a direct and positive one. Furthermore, movement patterns sometimes undergo considerable modification, even when reduction is not so pronounced, so that where in the first instance movement may appear erratic, retests after treatments sometimes reveal a smoothing out of the path of movement. The tendency for reduction to take place would seem, theoretically, to be in the desired direction, and is in keeping with introspective reports received from patients as to the extroverting effects shock produces. As to the question whether reductions in movement remain so, a number of patients have been retested on the occasion of a return to the hospital on a recommitment, or possibly only a visit, and these have nearly all shown a gradual return to greater movement, approximating in some instances their original indices.

TABLE IV

SHOWING DISTRIBUTION AND DIFFERENTIAL SIGNIFICANCE OF DISTRIBUTION OF AUTOKINETIC INDICES OF MALES AND FEMALES

Autokinetic indices	Normal subjects				Patients			
	Males		Females		Males		Females	
	Number of cases	%	Number of cases	%	Number of cases	%	Number of cases	%
0	23	8.3	31	20.8	175	37.0	209	56
1 to 50	123	45.0	72	48.3	156	33.0	104	27.8
Above 50	128	46.7	46	30.9	141	30.0	60	16.2
	Chi^2 (d. f. = 2) = 17.66, Significance = < 1%				Chi^2 (d. f. = 2) = 35, Significance = << 1%			

COMMENTS

Some impressions have been gained during the investigation which have not been exploited experimentally, but which merit further brief discussion.

There is evidence that through autokinetic reactions something akin to extroversion —introversion is being manifested. This can be substantiated partly by observing the general behavior of subjects taking the test, and is supported further by the way syndromes in patients ranged themselves in relation to the test results. The perceptual realism which permits no seen movement of the experimental light is interpreted more easily as derived from extratensive, syntonic traits of the individual. It is in persons with such traits that the manic-depressive psychoses and conversion hysterias are more apt to occur, and possibly also the involutional psychoses. In contrast, the subjective nature of autokinetic movement suggests that it is more commensurate with introversion, and hence also more readily to be found in schizophrenics. By analogy, at least, it would seem that the projective processes and the bizarreness in this form of illness, the inability to meet adequately the demands of reality, and the shifting of attention to subjective impressions with their autistic, unanchored proclivities all might find more fertile ground in autokinesis for their development. Periodically, subjects, both normal and psychotic, who were able to see extensive movement have remarked spontaneously that they recognized in the pattern of movement their "way of doing things," or "the way I am." It sometimes has been observed that persons capable of seeing extensive movement find the experience a pleasant preoccupation. Such preoccupations seem,

as a rule, not so much concerned with any specific content of thought as with a general feeling tone, though sometimes content does come into the experience. Occasionally subjects state that they are able to synchronize some specific thought trend with the course of movement. Such synchrony seems facilitated whenever there is the added ability of voluntary directional control of the movement. The capacity to control movement direction may be a fortifying feature in one who is given to extensive autokinesis. Normal subjects with high autokinetic indices seem to have more such ability than patients with similar indices. Subjects who see no movement give somewhat different reports. They frequently notice changes of brightness, intensity, and hue, changes of shape of the light, emanating rays, rotations, halo effects, recessions and approaches of the light, etc., but seldom speak of having a pleasant feeling. In fact, their remarks after the test often convey the impression that they considered the test an uneventful, prosaic affair. A few manics have expressed elation over the constant changes they claimed to have

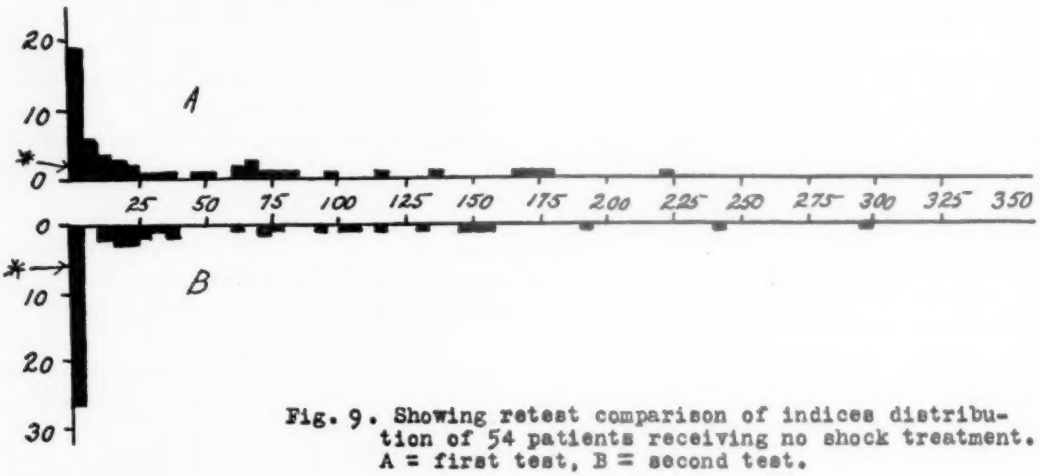

Fig. 9. Showing retest comparison of indices distribution of 54 patients receiving no shock treatment. A = first test, B = second test.

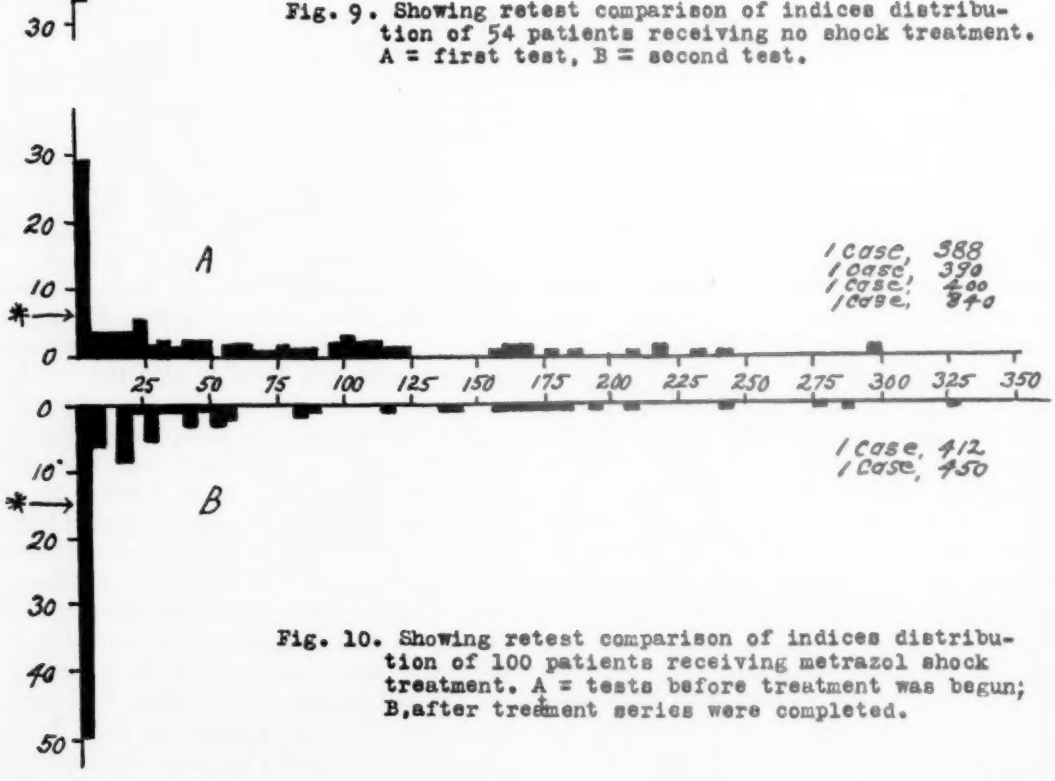

Fig. 10. Showing retest comparison of indices distribution of 100 patients receiving metrazol shock treatment. A = tests before treatment was begun; B, after treatment series were completed.

seen taking place in the light itself. If there is any differential feature in the test situation to distinguish manics from depressed patients it is that the manics are more inclined to notice such focal changes.

The question of why patients with medium autokinetic characteristics have shown better recovery rates is of special interest. In experiments with normal subjects those with medium indices often had greater ability to inhibit movement by voluntary effort, and within limits also to facilitate its extent, though not necessarily its direction. Some sampling among patients has shown similar traits. Furthermore, when normal subjects were tested in groups and then their reactions compared with those obtained through individual tests the greatest changes in index readings, apparently brought about by group influence, occurred in the area of medium indices. All this seems to point to a certain adaptability or flexibility of persons with such indices and may help to account for the better recovery records of patients with such movement traits. An attempt to specify how such patients differ symptomatically from patients with other movement patterns at times may be difficult on first sight. Closer observation reveals some fairly well defined tendencies. There is frequently a more pronounced symptom mixture which makes for a greater initial uncertainty in diagnosis. Excitement may often be very intense, with hallucinations and delusions prominent, but through all this, lucid moments sometimes come impressively to the fore, though possibly only for a few minutes at a time. There is usually more spontaneity in remission, shock therapy produces a more rapid recovery, and process schizophrenia and genuine blocking are found much less frequently than in patients with higher movement indices.

In comparing normal subjects with patients in Table IV a larger percentage of patients register no movement than do normals. It is not known whether this means that with the onset of illness a certain number of individuals reduce movement to zero, or whether more patients come from that group in the general population which is naturally prone to see no movement. From the fact that, with the exception where shock is an influence, patients do not radically change their autokinetic tendencies, the latter seems the more plausible. Thus far there are only 2 cases in which the test was performed before and after illness occurred. In both cases several years intervened between the first test and the illness, and in both instances the test during illness agreed with the first test as well as with the general diagnostic findings in this study.

How graph patterns are related to various types of psychoses remains at present a matter of appraisal of averages and trends rather than one of statistical certainty. When only movement above index 10 is considered manic-depressives show, on the average, a larger number of stops in the course of movement, and also lower indices than schizophrenics. Of all schizophrenics, hebephrenics show the greatest number of stops, the lowest indices and more erratic movement patterns. Catatonic and paranoid schizophrenics are nearest alike in their movement. However, paranoid schizophrenics represent the only diagnostic group in Table I in which an equal distribution between movement and non-movement is found. This raises the question whether this may be explained partly by the greater universality of paranoid symptoms and a consequent greater chance scatter in diagnosis.

Coupled with the finding that under ordinary circumstances autokinetic reactions have proven fairly constant in individuals, their use in personality testing may be enhanced by the discovery that under certain conditions modifications in autokinetic perception do take place. The effect of shock has already been mentioned. Sherif(12) and Sherif and Cantril(13) have shown that socially conditioned attitudes have an important bearing on bringing about changes, even in such relatively unstructured perceptual fields as afforded by the autokinetic test—more so for some individuals than for others. Haggard and Rose(10) found similar modifications taking place and attributed them to the active participation of the subject in the conditioning process. This all agrees with our findings in group tests and test trials under facilitating and inhibitory attitudes(16). The possibility for modifications in patterns and extent of autokinetic movement offers a wide range for test refinements,

and indicates the direction for more accurate diagnostic and prognostic evaluations, and possibly also for eventual therapeutic application.

There are several fields of investigation in which the autokinetic phenomenon might be used profitably to extend research in psychopathology, and to clarify the nature of autokinesis itself.

Since hallucinosis and autokinesis are more prominent in schizophrenia than in other severe functional psychoses, and both show projective characteristics, a relationship between the two suggests itself. The discovery by Kleint that autokinetic reactions are found in other sensory fields adds weight to this suggestion.

If, as it appears, autokinetic perception operates through central mechanisms, and shows some variations when the subject changes from a state of passivity or quiescence to intentional mental activity, then it would seem possible to establish some relationship between it and electro-encephalographic readings.

Speech involvements (stuttering) and blocking were found nearly always associated with considerable movement. The side to side movement so often found in stutterers, and in persons whose hemisphere dominance had been interfered with through handedness reversals in childhood, points to the theory of central origins of autokinesis. The suggestions by some investigators that stuttering, and the closely related phenomenon of blocking, may be due to a general neuro-muscular conditioning favoring such dysfunctions merits attention in the light of the opinion expressed by Adams, Kleint, Guilford and Dallenbach, and others, that autokinesis is always accompanied by body tensions concomitant with the direction of movement.

Disturbances of body image have been observed to be more bizarre and pronounced in schizophrenia than, *e. g.*, in the manic-depressive psychoses. It, therefore, seems logical that such labile perception as some persons show in autokinetic movement would provide a likely basis for investigating body image distortions. Pertinent to this is the idea of Benedek and Angyal(3) that a connection exists between the personality type and body schema disturbances, and that psychotic symptoms, especially in schizophrenia and in intoxications, can often be traced back to an analysis of body image disturbances.

Nearly every person from whom a history of migraine was obtained showed extensive movement. This gains added importance for further study in the light of the reactions of epileptics in the autokinetic test.

Complaints about the inability to fall asleep easily, and to sleep soundly, come more numerously from persons who experience little or no autokinesis. Among patients, manic-depressives are noted for their insomnia. There is evidence from questioning and observing subjects, both normal and psychotic, that those who experience more extensive autokinesis are inclined to be less pervious to all kinds of external stimuli, and can, under some conditions, intentionally exclude peripheral sensory distractions from consciousness. It seems this might have a direct bearing on the problems of sleep mechanisms. The question of hypnotizability enters in this connection. A number of normal subjects who saw extensive movement have remarked that they were aware of an hypnotic-like feeling during the test. This, coupled with the amenability of such persons to self-imposed suggestion of movement direction would make them seem, on first thought, good subjects for hypnosis. However, this does not agree with the classical findings in hypnosis and hysteria inasmuch as hysterical subjects are prone to see no autokinetic movement. It is, therefore, conceivable that such fixity of perception as sometimes seen in the autokinetic test would lend itself more easily to giving an outside command attention, whereas, the autism projected into seen movement might not be so compatible with the will of external authority.

Finally, the question has been raised frequently regarding the genesis of autokinesis in the development of personality. There is some evidence that it has some fairly early beginnings in life. A few children have been tested as early as age 5 to 9, with indications of seeing movement. A few were tested at age 10 to 12 and then followed for as much as ten years through occasional tests. They showed the same constancy found in adults. The tenacity of the trait was demonstrated

in shock patients in that it gradually assumed its original form after shock was discontinued. A few families have been tested. The father and mother were usually opposites in autokinesis, and the siblings showed variations ranging from zero to high indices. Three pairs of twins, however, showed the members of a pair to be alike—one pair registered zero, two pairs gave more extensive movement but similar patterns. Of approximately 60 normal married couples three-fourths of them were opposites. Only two couples showed both man and wife to have zero indices. In 60 couples, where either the husband or the wife was a mental patient, there were 12 instances where both the man and his wife had zero indices, and 4 more where movement was very restricted on both sides. The whole distribution complex of indices of the couples in which patients were represented was noticeably different from that of normal couples. These incomplete findings require further study, but they lead to speculation about the biological concomitants of autokinesis and its psychological dynamics.

Summary

The autokinetic phenomenon is the visual experience of apparent movement of a stationary object, and can be observed most effectively by looking at a fixed pin-point light in a totally dark room.

The phenomenon is offered here as a projective measure of personality structure, and in this sense is used as a diagnostic indicator in mental illness. The test has a proven high reliability. An index figure into which various aspects of the movement pattern is calculated is used for each subject. The movement is more pronounced in schizophrenia, epilepsy, psychasthenia, neurasthenia and anxiety states. In the manic-depressive and involutional psychoses, and in conversion hysteria, movement is, as a rule, either absent or much less extensive.

Atypical test results are discussed in the light of more detailed diagnostic opinions of the staff of the hospital in which the tests were given. Prognostic indications are found in the extent and patterns of movement. Limited or medium amount of movement may be considered prognostically more favorable than extensive or no movement. Fairly accurate limits, expressed in indices, have been established in this connection. Erratic movement patterns presage, on the average, a less favorable course of illness. Sex differences are shown in that more men than women observe autokinetic movement.

Under comments some implications and analogies are presented to show relationships between autokinesis and mental disturbances, and some suggestions are offered for further investigation.

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BRIEF PSYCHOTHERAPEUTIC INTERVIEWS IN THE TREATMENT OF EPILEPSY [1]

OSKAR DIETHELM, M.D., New York, N. Y.

It is important that all psychotherapy be adjusted to the needs which are indicated by the psychopathological findings of the patient. This concept takes into consideration the psychodynamic factors as well as all other psychopathological symptoms. The brevity or infrequency of interviews can and must be a part of intensive psychotherapy; *i.e.*, a psychotherapy which is intensive considering the particular problem to be attacked and corrected.

The indications for the type of therapy to be used in an epileptic patient should depend on the psychopathological findings, the dynamic factors involved, and the general personality setting. Those psychopathological findings which will influence psychotherapy greatly are thinking difficulties, emotional interferences, and the degree of deterioration. Psychotherapy uses language as a main tool. In order to utilize this tool most efficiently, the physician must recognize any difficulties which will interfere with the patient's ability to express himself through words and to understand fully the therapeutic procedure and the physician's language. Various degrees of disturbance of the intellectual functions are to be considered in most epileptic patients. For example, there is frequently a vagueness in the use of concepts and a tendency to digress from the topic under discussion. These tendencies necessitate active guidance by the physician as well as the use of concise expressions. The attention may be limited. In those patients who are usually treated in ambulatory practice, and whose psychopathological handicaps are frequently not recognized, a dynamic analysis of far-reaching degree is not possible. The physician must actively pull together the material which comes out in analysis; passive analysis must be considered contraindicated. Another important finding is the pathological persistence of emotions, often of unusual intensity. This fact prevents a satisfactory catharsis of more than transient value. There is a readiness to react with the same emotional pattern to relatively minor situations. It may be that even after far-reaching and repeated discharge of emotions a remnant exists and that this feature may be of essential psychopathological significance in some of the epileptic disorders. These emotional reactions may express hostile rejection or sentimental dependence and may be related to repressed material as well as being a direct response to actual situations. The latter reaction frequently seems to be a repetition of earlier childhood patterns. Besides an inability to forget unpleasant experiences and an urge to dwell on them, epileptic patients show frequently a tendency to shut out other experiences as well as to repress them readily. Treatment may utilize these tendencies constructively. In early deteriorative changes, and more so in advanced stages, perseveration of thinking and emotions, when recognized, can be used constructively in brief interviews whereas they lead readily to a waste of time and the destructive strengthening of undesirable emotions in in sessions of an hour's duration. One disturbing early symptom is difficulty in differentiating between the essential and the non-essential which leads to an apparent evasiveness, to circumstantiality and repetition.

In evaluating the dynamic factors, somatic (especially neurophysiologic), psychodynamic, and socio-economic factors must be considered. In the long-term treatment of an epileptic disorder one must be aware of the constant changes which take place in the patient. They may be marked or mild, sudden or insidious, and with these changes the relative or the absolute significance of various of these factors assumes a different meaning. Treatment must take cognizance of the constellation present, but must also be based on a long-term plan which is plastic

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From The New York Hospital and The Department of Psychiatry, Cornell University Medical College, New York.

but consistent, fitting the individual epileptic patient. In this setting, symptomatic treatment is essential as it helps to ameliorate personal and social difficulties and offers better possibilities for a constructive attack on the larger problem of permanent adjustment. In the use of anticonvulsive medication one should guard against the suppression of neurogenic symptoms without noting their psychological effect on intellectual and emotional functions. The desired result of treatment should not be the absolute control of a group of symptoms but the optimal control in relation to all the symptoms present. Whether the older clinician's statement is correct that the release of pent-up personality reactions through occasional convulsions is desirable and whether one might actually evoke them judiciously is a therapeutic problem which should receive critical consideration. A psychodynamic analysis, based on the modern genetic-dynamic approach, is important in every patient. On the other hand, the still little understood epileptic psychopathology is inviting to speculation which may result in an unrecognized symptomatic treatment. Erotic sentimentality, sexual symbolism, and not infrequently overt sexual psychopathology force the therapeutic attention to the possibility of a far-reaching analysis, or at least to the use of modern psychopathological knowledge in interpreting difficulties to the patient in a way befitting his needs. Very often, especially in patients with other psychopathological involvements which are not very obvious, an analysis of the sexual factors may become exclusive and therefore symptomatic. Such treatment becomes especially destructive in deteriorating epileptics because of their perseverating emotional features and their inability for spontaneous synthesis. One should also consider that anxiety and resentment, stirred up in dynamic analysis, may affect epileptic psychopathology adversely. These emotional reactions, which are valuable tools in the analsis of other conditions, should be used here sparsely and in a restricted way. The beneficial results which were obtained by Hendrick can be supported by the author's personal therapeutic experience. A critical reading of the publications of therapeutic enthusiasts of 20 years ago will reveal the unfortunate results of injudicious sexual analysis. Among the patients treated by the author were several who had received symptomatic sexual analysis by other psychiatrists. In every epileptic, an understanding of the family relationships and the development of the individual from infancy are important. Frequently, however, in the immature epileptic the physician may become fascinated by the possibility of finding the main therapeutic solution in the analysis of the psychodynamic syndrome of the parental and sibling relationships and apply knowledge gained from the broad field of psychopathology uncritically to the special aspects of the epileptic disorder. The dynamic aspects of the patient-physician relationship have in the past received unsatisfactory attention in the treatment of epileptic patients. It is, for example, unclear whether special psychopathological factors preclude a therapeutic use of a transference neurosis. Transient or permanent transference relationships of various degrees have been used successfully, but the physician has to depend on his personal experience with epileptic patients as literature offers little. The successful manipulation of socio-economic factors may be hindered by difficulties in planning an education suitable to the psychopathological findings, by poor adjustment to living in crowded cities and towns, and by lack of acceptable work in the mechanized and complex competitive labor conditions of today. Whenever the epileptic process has advanced to the degree of marked, although not wholly incapacitating, deterioration or where it occurs in the setting of oligophrenic conditions, treatment in and out of hospitals may become a most difficult task.

The personality setting in which an epileptic disorder occurs is important therapeutically. Some personality features may be constitutional but in treating the patient one must remember that one deals with an individual whose growth in life has been influenced by many, and some of them poorly understood, factors. Modification and limitation of treatment are necessitated by the psychopathology of the immature, the dependent, and the psychopathic personality. To this latter group belong the loosely organized and ill-controlled as well as the set, unbending personalities.

The technical procedure of brief psychotherapeutic interviews must be based on general dynamic principles which, whenever possible, should be supported by the dynamic study of the individual patient. The knowledge of dynamic psychopathology permits the physician to recognize unclear factors and deal with them instead of having the patient make an attempt at analysis of all repressed factors. The result is an active guiding of the patient by means of constant evaluation of the changing psychopathology as well as the underlying psychodynamic factors. For general guidance concerning the pace of the treatment, one should be directed by the patient's success in dynamic adjustment, by his symptomatic improvement, and by warning signals which demand a decrease of psychotherapeutic pressure or a new orientation in the therapeutic plan. Such warning signals are the increased frequency or severity of convulsions and petit mal attacks and especially increased anxiety leading to thinking disorders and epileptic equivalents, including depressive reactions. In the patient's acting out, it may be difficult to recognize what is due to epilepsy and what to underlying general personality disorder, e.g., an unwillingness to assume responsibility. The therapeutic difficulty becomes especially marked when a patient is capable of using convulsions or other epileptic symptoms for acting out. Resentment may assume the form of paranoid reactions. Further warning can be recognized in the non-constructive use of knowledge gained from analysis and in the coloring of the convulsive attacks through sexual stirrings.

At the beginning of treatment, discussions of one hour's duration are indicated, even in patients with marked psychopathology, until one has obtained a good understanding of the psychopathology, of the life development, of interpersonal relationships, of present life adjustment, and of obvious difficulties. During this phase a positive patient-physician relationship will become established. The subsequent interviews, once a week to once a month, may last from 15 minutes to an hour. It is possible to shorten the interviews because one has become intimately acquainted with the life pattern, the personalities in it, and the repetitious emotional involvements. The progressive treatment usually leads to a marked dependence on the physician, who should utilize this relationship to make the patient carry an increasing amount of responsibility.

The goal of treatment should be a new orientation to the problems related to the illness and to interpersonal relations. Increasing self-reliance should go together with better socialization. The modification of rigid standards will permit a better dealing with the problems of reality. A more detached and tolerant attitude to body appearance and somatic functions should be striven for. Planned re-education must be pursued to modify and, if possible, change the patient's undue attention to detail, his indecision, egocentricity and indulgence in phantasy life.

There are several therapeutic problems which occur in a large number of epileptic patients and therefore deserve a more detailed discussion. Resentment is a destructive emotion which interferes a great deal with a healthy life adjustment. The release of these pent-up emotions is helpful in the beginning of treatment. Soon it will become obvious that mere rediscussion will keep the resentment alive. One has to try to make the patient recognize the factors involved and to develop tolerance. It is usually unwise to dwell too lengthily or too frequently on such discussions and one should guard against letting the analysis of these emotional reactions become symptomatic therapy. Aggressive resentment is readily recognized while resentment in shy and withdrawn patients, suppressed and often not noticed by them, may escape therapeutic attention. Treatment must take into consideration the reactions of resentment to special situations as well as the underlying capacity to experience readily intense resentment. A tendency to projection is part of intense resentment. These projections, which may assume the form of paranoid symptoms, are usually transient and do not disorganize the patient's personal life nor do they lead to systematization. They should be distinguished from the essentially paranoid epileptic reactions. Dynamic analysis of resentment becomes impossible when this emotion is accompanied by marked anxiety which leads to disorders of attention and concentration. The physician must be aware of his reaction to the

resentment and guard against thwarting its release or dissolution by argument or by domineering aggression. He should suggest possible errors in the patient's judgment or point out other possible interpretations or situations in the form of questions. This aspect of treatment corresponds to that of paranoic reactions. One should also remember that persons usually react with an increase of the emotion if they are told that they are hostile or resentful. A less disturbing reaction occurs if one remarks to the patient that he appears irritable or annoyed. It is possible that, as some authors claim, the epileptic patient has a pathological degree of self-satisfying and self-magnifying needs and therefore reacts with resentment to being thwarted in their fulfilment.

In analyzing the patient's emotional reactions one has to determine how much intense emotional participation the patient can endure. Emotional discharge and the accompanying insight must take place gradually. Sometimes the physician may have the impression that the patient is experiencing full emotional abreaction while he is working through the dynamic factors, whereas in reality the patient is only obtaining the repetitive satisfaction in expressing resentment. Discussions at well-spaced intervals with psychotherapeutic readjustment over a long period of time may be necessary to prepare the patient emotionally for the insight which he otherwise could not tolerate. The physician will gain the psychodynamic understanding of resentment before the patient is able to accept it. In some patients, siblings or parents may have similar personality traits. In such cases a temporary separation while undergoing psychotherapy may lead to an improvement which will permit him to deal with these personalities more constructively than previously. In other patients, psychotherapy reveals frustrated aggression as a fundamental factor in producing resentment. It may be possible to solve the problem without the patient's analysis of the dynamic factors.

The pathological emotional reactions of anxiety and depression frequently need therapeutic attention. It is usually satisfactory to analyze these reactions with regard to immediate life situations, with attention to previous similar reactions and their relation to fundamental dynamic aspects. It seems hazardous, however, to make the analysis of these emotional reactions the center of an intensive therapeutic analysis on the theory that the dread of losing consciousness is linked up with the fundamental dynamic factors of the epileptic disorder. One should avoid producing fears and dangerous insecurity by the unwise analysis of anxiety and defense reaction.

Stubborn self-assertion, expressed in aggressive attacks or in weak but persistent resistance, usually has to be modified on the basis of the physician's, but rarely the patient's, understanding of the dynamic factors. A formulation of relatively obvious factors can be made the working basis for a modification of the patient's attitude to certain personalities and situations. Infrequent brief interviews are helpful in this planned re-education whereas daily interviews, with the unavoidable stirring up of anxiety or resentment, may increase the patient's regressive and procrastinating tendencies.

Insufficient emancipation from one of their parents with frequent or persistent unconscious attempts at unsuccessful independence are present in many patients. Through a positive patient-physician relationship the physician will be in a position to offer emotional security and sympathetic affection which will permit the patient's healthy self-assertion based on increased self-reliance. It is not necessary, and frequently inadvisable, to make the patient aware of the true nature of his relationship to his parents. Support and guidance through the emotionally strong transference relationship must be offered for years in some of these patients. It is obvious that a physician must understand his own reactions to the patient and have a progressive plan of treatment if he wants to remain active psychotherapeutically and make each interview a therapeutic worthwhile task. The patient's frequent sentimental attachment is a thin veneer for the underlying sexual involvement of which he should usually not be made aware. The analysis of sexual factors is important but should be carried only as far as the patient can handle. The

principal therapeutic task may be a healthy sexual hygiene which the patient is able to follow by accepting his physician's advice.

The epileptic patient has a characteristic attitude to his body—a need for physical perfection and anxiety to somatic malfunctioning. There is a constant need to rely on his physician's reassurances and a meticulous attention to physical hygiene. Whether this body attitude is the expression of deep-seated narcissism or related to a marked anal-erotic orientation are speculations which cannot be proved with our present knowledge. The marked insecurity is therapeutically important. Recognizing the painful emotion of anxiety, a physician will always be ready to seek means of alleviating it. Only if he thinks of this reaction as hypochondriasis with its connotation of unjustified overconcern will he become bored with these patients. With each return of the expression of body insecurity he is forced to look for factors which have brought about an increase of anxiety. In patients who are capable of understanding the influence of emotions on physiologic functions, brief interviews will reveal the dynamic factors of the immediate situation. This treatment implies the need to check carefully on each new symptom before its psychogenic nature is accepted. If this is done promptly and judiciously even re-examination will not disturb the security which has been built up previously. In addition, the patient must learn to correct his habit of being aware of minor body sensations and become tolerant of somatic inadequacies.

Difficulties in relationship to other persons, aggravated by the patient's self-centered sensitiveness and his ability to form intense and lasting antipathies and attachments, need separate analysis and constant therapeutic attention. In this respect, as well as in all brief psychotherapy, the danger is ever present that one tries to obtain too many facts to prove the suspected dynamic factors and that one offers too much dynamic interpretation or at too early a phase of treatment. One of the goals of treatment should always be to broaden the patient's interests and to permit him to share with others. Frequently one may have to be satisfied with a group adjustment which is based on helping others in order to satisfy self-centered glorification.

SUMMARY

Brief psychotherapeutic interviews try to utilize the dynamic knowledge of the individual patient's past life and to apply it to a satisfactory adjustment to the present. His hopes and plans for the future are constantly taken into consideration. Difficulties which precipitate maladjustments are reviewed from the same point of view. The treatment considers impaired functions, such as disorders of attention, concentration and thinking, in the technique of the interview. Recurrent resentment and anxiety may be relieved through a necessarily very limited analysis and their intensity reduced. The persistence of these destructive emotions as well as the presence of other psychopathological symptoms may limit or prevent an analysis which would give the patient an understanding of the dynamic factors. In order to proceed one must correct the factors which lead to therapeutic obstructions or attempt the dynamic analysis when the patient becomes ready for it. This type of psychotherapy must use a plan of treatment which covers a long period of time and which is reconsidered and modified whenever psychopathological changes or psychodynamic, somatic or environmental factors make it necessary. The results of the patient's adjustment of, and to, his life problems are encouraging enough to justify his physician's active therapy and guidance during the long period of the epileptic disorder.

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STATE HOSPITAL SCHOOL FOR EPILEPTIC CHILDREN[1]

R. L. DIXON

Medical Superintendent, Caro (Michigan) State Hospital for Epileptics

In 1929, a survey was conducted in Michigan, through the State Superintendent of Public Instruction, to determine the approximate number of educable epileptic children who were being deprived of an opportunity to attend school because of their convulsive manifestations. This revealed an actual total of 386, and there was no doubt that there were others who were not reached by the study. It included Wayne County with the city of Detroit to a very slight degree.

In 1934, a survey was made in Detroit, which revealed that 514 epileptics were known to the Board of Education, of which many had been excluded from, or were having difficulty staying in, school because of their seizures. Thereupon, in June of that year, the Detroit School Board established the first public school for epileptics in the United States, now known as the White Special School. Children were collected from all parts of the city by bus and medical care was included in the program.

In 1944, we made a survey of the states to determine how many provide schools for epileptic children. There are in this country only 11 state institutions solely for epileptics and, of these, 8 have some sort of school facilities; 6 have regular school buildings constructed for that special purpose, one utilizes its chapel, and another has school rooms in its residence buildings. There are many children with convulsive disorders in institutions for the mentally deficient who have educational opportunities, but the needs of those of normal intelligence are not adequately met in this manner.

The school unit at the Caro State Hospital was opened in the summer of 1940 with a capacity of 150. The school building and three residences, each housing 50 children, comprise the present unit, but the master plan calls for eight such cottages. Foresight was exercised in the construction of the school building, in that it can be added to in proportion to the increase in bed capacity without impairing the architectural or functional value of the building. It is a one-story, sixteen room structure, planned and equipped for the special needs and safety of the epileptic child. Each classroom has its own lavatory and seizure recovery room where children may be cared for by a nurse, summoned by a buzzer, during and immediately following a seizure. This room has large windows between it and the classroom so that if a child merely needs to sleep after recovery from the attack proper, he can be under observation of the teacher. There are seven rooms for academic work, which are twenty feet square, and five larger rooms for kindergarten, music, and shops. The other four are: the principal's office, the attendant nurse's waiting room and office, the library, and combination auditorium and gymnasium complete with a stage and motion picture apparatus.

The normal personnel of the school is made up of the principal, five academic teachers, five special teachers, an attendant nurse and a caretaker. The academic requirements for our teachers are determined by the State Department of Public Instruction and are as follows: 120 semester hours of Teacher's College training, of which 30 hours shall have been in the field of special education. However, this qualifies the teacher for only a five-year provisional certificate, and he must have acquired 10 semester hours at the graduate level before the expiration of this period, in order to obtain a permanent certificate. The salary scale for the principal is $250 to $290 per month for twelve months, and for the teachers $200 to $240 for ten months, with the exception of the physical education instructors. These two, a man and a woman, are employed on a yearly basis, as a recreational program is continued through the summer months.

During the first five years of the school's existence, 301 children have been enrolled; 37½ percent of these are still attending. Those who are still in residence, but not in

[1] Read at the 102nd annual meeting of The American Psychiatric Association, Chicago, Ill., May 27-30, 1946.

school, comprise 32½ percent, and their exclusion was due to such factors as maximum age, inability to profit by further training, extreme conduct disorders, and physical handicaps. Of the total group, 20 percent are on parole, 5 percent have been discharged and 5 percent have died. The ratio of boys to girls, due to housing facilities, is 60 percent to 40 percent respectively, and there is no noteworthy difference in the mental status of the two sexes. The largest age group, both on admission and in attendance, is 11 to 15 years.

Academic work through the eighth grade is offered and those capable of carrying more advanced subjects are given individual help. The curriculum also includes music, physical education, sewing, shop, and manual and fine arts.

The basic aims of the school are not defined in terms of academic progress. While we undertake to guide and encourage the children in the development of essential skills consistent with their ability, we also try to plan their curricula in such a way as to assure their happiness and personal satisfaction in their school work. The greatest emphasis is placed on social adjustment, for we believe that if this is accomplished, school achievement follows naturally. In a large percentage of cases it is the convulsions plus unacceptable conduct and personal relationships that have brought these children to us. Therefore, the development of social patterns of behavior, the recognition and acceptance of their own situations and limitations and the broadening of their experience through formal teaching, all of which fit the child for more useful, happy living, are the real aims of our educational program. Our ideal is the return of the child to his home and public school, but we are limited in its achievement by such factors as inadequate parents, unsatisfactory living conditions, and other mental and physical handicaps not amenable to treatment.

The school department cannot function efficiently as a discrete unit, but must have a working relationship with the services and facilities of the entire institution. Herein lies our advantage over the public school which must combat destructive influences that are at play on the child during the school hours.

At the time of commitment the court papers on children of school age are referred to the social service department for review and further investigation to determine their eligibility for school enrollment. A personal contact with the family is thus established early, which is further strengthened by the admission interview and maintained through correspondence, office interviews and a social worker's visit to the home. Vacation plans are effected through this department, and all children whose homes are satisfactory and parents adequate to their supervision are permitted to leave during the school holidays. Not infrequently, the parents are very much in need of help in relation to attitudes, discipline and personal emotional problems. Parole plans and supervision during the parole period are also social service responsibilities.

The psychological department has an active relationship to the school, as all children are studied thoroughly on admission from the standpoint of intelligence, performance ability, and educational ability. Referrals to the school are made through this department, which reports detailed results of the studies to the principal. Routine retests are also made, and special cases may be referred by the teachers for study and advice.

The physical and neurological examinations are regular parts of the admission procedure, together with complete X-ray and laboratory studies. The teachers have access to the records which are, of course, valuable particularly in relation to visual and hearing disabilities and various types of paralysis. The physician immediately undertakes to control the attacks by the use of all known anti-convulsants, used singly and in various combinations. A doctor is always immediately accessible in case of emergency and the children are regularly observed by their cottage physician in relation to their general health.

The child's home during hours out of school is an attractive one-story building housing 50 children within a normal family range of ages. The parent person is a woman for the girls and little boys, and a man for the older boys. However, there are both male and female attendants in the boys' buildings. The children participate in the housekeeping and care of their grounds and each has

some little duty or responsibility. The supervisor handles all minor disciplinary problems but must have the approval of the cottage physician for anything indicating extended withdrawal of privileges. No corporal punishment is permitted and the only accepted method is restriction of activities and pleasures. The child is held up to the same standard of behavior at school and at the cottage, with close cooperation among all in authority. This consistency of discipline and unity of control are in themselves stabilizing factors. While kindness is practically a motto with us, there is very little of the emotionalism involved which governs parents in their demands on an afflicted child. The proper relationship between the institution parent and the true one is at times difficult to achieve, as many of the children transfer their affections a little too readily for the mother's comfort. Nevertheless, the intelligent and unselfish parent is generally gratified to know that his child is happy and at last finding the security and comradeship that the home and community failed to give him.

THE USE OF RESIDENCE IN PSYCHIATRIC TREATMENT WITH CHILDREN[1]

J. FRANKLIN ROBINSON, M. D., WILKES-BARRE, PA.

Resident psychiatric treatment as developed at the Children's Service Center of Wyoming Valley has been a practical application in residence of practice and principles evolved in the child guidance clinic. Basic to clinic practice is the recognition that both child and parent have had a part in the creation of the difficulty for which help is sought, and that both will have a part in the solution. The child is seen as an immature individual who cannot be approached as an isolated entity but must be considered in relation to a complementary parental force.

Before psychiatric treatment is undertaken it is necessary that domestic responsibility for the child be clearly defined. If custody for a child is not actively assumed his primary need is a foster one and, indeed, such an unmet personal need may contribute to emotional disturbance and the development of symptoms. We believe that if a domestically isolated child can form a tie it should be with a parental force which can continue to have meaning for him. Hence such a sustaining association should be with parent or foster agency and should not be with the therapeutic agent which must bear to him a temporary relation.

For many children it is probably not possible to become really engaged in psychiatric treatment until they have been able to establish a strengthened association with parent or foster agency. There is in any event a high correlation between the ultimate prognosis and the degree to which connection with the parental force has been enriched.

Admission to residence for treatment must then be utilized to emphasize the inter-relatedness of child and parent rather than be allowed to create complete separation. Circumstances which hold child and parental force together are that the parent or foster worker has chosen this type of help for his child, that he maintains a relationship with him while he is in residence and that he will be responsible for the continuing plan when the child leaves residence. This relationship to the child in residence is maintained through visits with the child and also with the social case worker at the center. The child derives his security in residence less from the understanding and acceptance of him by those with whom he lives than from his active and sustaining relation to parent or foster agency.

At the onset, it is important to go beyond the symptoms to some preliminary understanding of the psychological dynamics of the difficulty so that the child has a beginning awareness of his emotional need and of his part in the problem. If the reason for his admission to residence is the prevention or alteration of a circumscribed kind of behavior, the resident center takes over the same difficulty with which the parent or foster worker has been entangled with the child, and the child may simply transfer his struggle to the residence. As attention centers on his emotional turmoil rather than his overt behavior a basis is provided for the child's use of psychotherapy and takes the process out of the area of training or discipline as is implied in a school setting or correctional institution or "Home." His use of a treatment relationship is the sole purpose of the child's being in residence.

In arranging admission we are now not primarily concerned with the symptom picture but are more interested in ascertaining that there is a sound basis for beginning work. It is the parents' or foster agency's interest and concern which motivates the process and the child becomes an active participant only after a plan has been formulated to make this type of help available for him. A preliminary visit (occasionally several visits) is arranged prior to the child's actual entry into residence. This provides an opportunity to establish the rôles which parent and child will play and to ascertain that the child has some capacity to relate.

[1] Read at the round table on child psychiatry, at the 102nd annual meeting of The American Psychiatric Association, Chicago, Ill., May 27-30, 1946.

When the child does come into residence the coordinated work of the whole professional group is necessary in order to enable him to utilize effectively his treatment relationship. He is going to present difficulties in living according to the nature of his attitudes, abilities and way of relating to others. As in setting up the treatment plan in application, it is important now that attention does not become centered and fixed on a few practical issues rather than in treatment itself. There is some danger that the child may invest his interest and drive in a vicarious achievement as, for example, in school or in outside group activities. There is more hazard that issues may arise analogous to those which occasioned the parent's decision to seek help and that efforts to alter the behavior are so intensified that treatment becomes a secondary experience for the child. Troublesome behavior must be accepted as an expression of the child's difficulty and of what he is able to be at the time. The major concern is the manner in which he is becoming engaged in therapy.

This does not imply that resident professional staff permit full license in behavior. That would be artificial and would deny the real meaning of what the child is doing. Part of the significance of his behavior is already absent because he is not in altercation with family or foster home, but the very important quality which derives from his own feelings and tendencies is present. The resident staff member becomes related to the child around his actual behavior in the living setting. He represents authority in so far as the center takes over the responsibility for control in the life of the child. He can provide, to a degree, a limiting quality for the over-aggressive, disorganized child. He can encourage more active participation by the fearful or uncertain child. But primarily he is affording a living medium in which a child can find a place according to his own interests and tendencies. He has no desire to mold the child's actions but is interested in helping the child come to more awareness of the manner in which he directs his own actions. His response to the child differs from that of the therapist in that his concern is not to help the child express and examine his feeling, but to help him act in relation to living requirements.

In assaying behavior, resident staff must be oriented to where the child is in treatment. The aim in the initial critical period in residence is to help the child to a clearer definition of his behavioral tendencies. The parent's steps to seek help for him, which involve his placement in the treatment center, will arouse feelings and reactions which grow out of his particular difficulty. These provide an immediate basis for his relation to the therapist. As the child can center his troubled feelings in his treatment hours, there is less need for him to become entangled through his behavior in the living setting. Efforts to induce the child to benefit from experience itself, or to instruct or train the child in the initial period, tend to over-emphasize the importance of the living setting rather than therapy, and encourage the child to create issues which are difficult to meet.

The resident staff must be aware of behavior which derives from feelings aroused by the child's further involvement in therapy. For example, when treatment is difficult or painful, the child's efforts to avoid deeper involvement may occasionally take the form of frank truancy from treatment hours or runaway escapades. A more indirect type of evasion of treatment is seen when a child seeks to discuss an increasing amount of intimate personal material with resident staff rather than share his feelings with the therapist. Again, hostility which the child may not be ready to express with the therapist may lead to hostile acts within the group. The real meaning of such behavior, for the child, becomes altered if the response from resident staff is based on the external implication.

As the child makes further progress in treatment and is able to better reconcile his conflicting feelings and to develop a more confident sense of his capacities, he will sooner or later seek a new level or relationship within the resident group. Resident staff need to realize the full implication in incipient trends in behavior so that the child is supported in what he is ready to be rather than held to the patterns he initially turned to when he established himself in the living group. Sometimes it is difficult to recognize that there is a quality of self-realization in a child's actions, especially when the child himself relates what he is

doing to either antagonistic or very positive feelings about treatment, but if one follows the child's treatment hours carefully, the distinction can usually be made.

The child's progress, especially as it is reflected in behavior, will often uniquely arouse the feelings of parents. It is challenging to see a child realize accomplishment which he could not reach at home and the parent may respond in a variety of ways. He may, for example, feel more intensely the separation which he has arranged between himself and his child and want to re-establish the closeness out of which so much of their difficulty had grown. He may feel antagonistic to the treatment center and attempt to project on the center the responsibility for his child's being away from him. He may be unable or unwilling to recognize changes in the child. His feelings of rejection may come frankly to the fore. He may at once experience a new measure of common feeling with his child. Whatever the parent's response, it brings into relief the quality of parental nurture which has complemented the child's development. Work with the parent needs to be closely related to what he encounters in the child's newly emerging self and the manner in which he can more satisfactorily fulfill his parental rôle.

In order that treatment can take form around what child and therapist can establish together, it is necessary that the experience be freed from the practical responsibility which the center carries for the child. The psychiatrist will be to the child a person of some consequence. He must, however, avoid becoming the practical mediator of the child's daily affairs or the relationship takes on other qualities than psychotherapy. The child learns to turn to the resident staff with his plights and quandaries. By investing authority in the resident professional staff the actual consequences of the child's behavior devolve within the resident setting. His real activities come into treatment as the child is ready to consider them and his confidences are respected.

Psychotherapy is an exacting endeavor. It may, especially at the beginning, assess the child's capacity to the full. We accordingly do not introduce auxiliary measures until it is apparent that they too can be accommodated by the child. Children with emotional difficulties that have existed for some time have many concrete deficiencies in achievement. Lack of school progress might be mentioned as an example. The successful utilization of remedial instruction would relieve the child of pressure from teachers and the frustrated feelings of failure, but it does not reach the basic trouble which itself is the cause of the retardation. It is illogical to try to immediately meet a child's practical needs fully when his lack of accomplishment is an indication that he cannot accomplish. We feel then that the child should be soundly established in treatment before ancillary measures are introduced. A more effective use of supplementary procedures is then possible.

As the ending experience unfolds one can see the value in the child having a sound and immediate relationship to those who carry parental responsibility for him. When he is ready to dispense with therapy, a continuing plan is possible for him only as it is supported by parent or foster agency. If residence has allowed a separation of child and parent to occur, or if changes have taken place in the child to which the parent is not attuned, a basis for the re-establishment of the home does not exist. There is even less to build upon if the attitudes of the parent, which led him to seek a physical separation from his child, are unaltered. The child under foster custody, without foster agency ties, would find himself isolated, or at least would face the prospect of taking on a completely new set of loyalties.

Actually, the decision to end stirs up a whole gamut of feelings in child and parent. The child may struggle against leaving the therapist, as he does in the out-patient clinic. He frequently has a deep measure of fear and uncertainty about the plan which is taking form for him. He doubts his newly acquired capacities. Old feelings are aroused and he may be inclined to deny his new self and reach back to his earlier difficult patterns. In a similar manner, the parent's apprehension may cause him to question their readiness to proceed and to mistrust the changes in his child. These feelings can be worked through in some part before the actual move from residence occurs, but a sound termination of the resident plan can only be founded on a matured and dependable relationship

between child and parent, which provides a basis for their continuation together.

Resident psychiatric treatment is an integrating experience. As in the out-patient child guidance clinic, treatment unfolds around a structure which involves the child and a parental force. The resident factor is introduced where the child-parental constellation is not sufficiently established or free that therapy can be arranged on an out-patient basis. Psychotherapy with the child is, however, the same process and through it the child moves to a healthier relation with parent or foster agency.

INSTITUTIONAL TREATMENT OF JUVENILE DELINQUENTS[1]

LEONARD M. DUB, M. D., WASHINGTON, D. C.[2]

Because the society in which we live has not, as yet, devised any other widespread method of dealing with juvenile delinquents, they are usually placed in institutions, ostensibly for corrective treatment. Because this is the prevailing method, a great responsibility rests upon the institutions. "Corrective treatment" may, by an institution, be interpreted as punishment, or it may be interpreted as rehabilitation. The distinction is an important one. But it is of graver concern to the psychiatrist that the latter approach, unless thoroughly developed and executed, can fail miserably as the first to reach the individual brought under the institution's care.

Many of our institutions have evolved programs and activities for their population, including academic or vocational guidance, and thus have attempted to graduate rehabilitated individuals capable of meeting and solving the problems they will face when they return to society. On some occasions this method may meet with some success, but on the whole institutionalization is significantly unsuccessful even under the best of educational set-ups. Various studies of recidivism, such as those of the Gluecks(1), serve to verify this impression. There are many probable causes for this failure in efforts at rehabilitation, some too obvious to merit much discussion at this time. They include punitive intent, lack of minimal facilities, poor organization, etc. It is probably universally accepted that the institutional regime does not reach and change the individual. Recidivism is the rule rather than the exception.

Since placing juvenile delinquents in institutions is the predominant means our present society employs in dealing with this problem, it seems imperative to examine some of the sources of their failure. One of the major points that should be made clear immediately is that delinquency or anti-social behavior is the end result of internal conflicts which have come about through the individual's relationships within his environment. Delinquent behavior is the outward manifestation of inner difficulties of which the boy or girl is unaware. It follows that the juvenile delinquent is, from the point of view of psychiatry, a neurotic with unresolved conflicts, unconscious drives for which he is not responsible. It is impossible for him to understand them or even know that they exist.

This approach to the problem is borne out in an article(2) which surveyed literature on individual correlates of crime. These correlates included: definition of crime, chronological age, sex, race and nationality, physical traits, intelligence in relation to age and offense, specific personality tests, and multiple factors, etc.

A general conclusion from this series of studies (which is representative of many others) is that the juvenile delinquent is inferior in many aspects of personality. This is evident from the emphasis on worry, the high score on tests of neurotic tendency, the retardation on tests of social maturity.

If we establish the fact that juvenile offenders are neurotic in character, it naturally follows that their needs, if they are really to be rehabilitated, include comprehending psychiatric care and treatment. It is unfortunately true that little or no organized efforts are, as yet, made for this type of rectification in institutional placement.

Prior to and during incarceration all efforts are usually in the "accusative case"—and by that, I mean that they are usually directed toward the manipulation of conscious motivational factors. It is self-evident that anti-social behavior is motivated by unconscious factors. It is also self-evident that if punishment is based on principles which are the derivatives of the conscious minds of those who deal with the young offenders, it is fruitless to expect results from the punishment.

This type of treatment, touching only the surface of the neurotic mind, too often spot-

[1] Read at the 102nd annual meeting of The American Psychiatric Association, Chicago, Ill., May 27-30, 1946.

[2] Assisted by Ruth Newton, B. A.

lights the specific offense, leaving in the shadows the causes for the offense, the unconscious motivations. It is axiomatic in psychiatry to treat causes rather than the symptoms, and it bears repeating that delinquent behavior is symptomatic.

It is true that efforts are made, in many cases, to determine how the individual has been adversely influenced by his recent and immediate environment. And there have been changes in the approach to this type of investigation. Factors, such as Lombrosian concepts, anthropological defects, and genetically transmitted criminal tendencies have been outmoded and are no longer considered valid as etiology, but other equally invalid factors are often magnified in importance.

We must distinguish between what is hereditary and what is acquired. Physical characteristics and probably intelligence follow some genetic pattern. Attitudes at any given moment are resultant from previous life experiences. They are probably never inherited or even influenced by hereditary predispositions. This is another important distinction to those who deal with juvenile delinquents.

It is because attitudes are acquired that they can, at least theoretically, be changed and the individual benefited thereby. Anti-social behavior, like any neurotic expression, can best be modified by directing therapeutic efforts toward the unconscious factors that cause the behavior. It is not clear why the delinquent adopts delinquent symptoms rather than some other form of neurotic behavior. It is quite probable that some significant interpersonal relationship offered more satisfaction through anti-social behavior It is also possible that such action is a result of emulation. Environment, therefore, is significant at the inception of the delinquent pattern, even though it becomes less significant during the perpetuation of the pattern. The parents of delinquents are usually hostile and unscrupulous and the child has to learn to adapt himself to the unpredictable environment offering a lack of adequate affection.

Delinquency, by definition, usually involves adolescence, a period of transition, when a person is no longer a child and not yet an adult. Many incisive changes take place in this period. The body, usually in a surge, achieves its maximum growth and assumes its characteristic configuration. Sexual development reaches procreative capacity, and amorous stirrings seek a variety of outlets. There is a striving after emancipation from the previous sheltered existence, an urgency toward increasing self-dependence in thought and action. The sphere of interest expands from the confines of the immediate environment toward the community at large. Current standards and precepts are submitted to criticism, not as yet leavened or seasoned by experience, and the established order is boldly challenged and too often rejected. Adolescence is truly the period of revolt; the period when established order is readily identified with the constraints of the parental or authoritative relationships and therefore must be overthrown in order that the individual disclaim the dependency of childhood. Admissibly inherent weaknesses, exposure to educational blunders and burdensome life situations serve to intensify perplexities and twist attitudes and performances(3). It is the development of these attitudes that needs investigation.

When the physical needs of the child have been adequately met, the body develops properly. In a similar manner. when the emotional needs of the child have been adequately met, the attitudes develop properly. These emotional needs involve satisfactions and security, and they are therefore dependent upon the environment out of which the individual draws his emotional experiences. The most significant emotional experience is derived from the interpersonal relation with the first person who administers to the needs of the infant, usually the mother. This relationship sets the pattern. An insecure mother can provide the initial conditioning for insecurity in the child. Such an unhappy parent derives a measure of satisfaction in administering to her offspring, and this over-solicitude, actually a form of rejection, is often selfishly perpetuated beyond reasonable limits, eventually resulting in an immature, as well as insecure, and latently hostile individual.

Perception of attitude, or empathy, is the most powerful conditioning force in our culture. All through life we are restricted to more or less conventional patterns of behavior by group pressures. Defiance of these

conventions makes for insecurity. These group pressures are perception of attitude multiplied many times. We are, however, lamentably unaware of how quickly the child perceives the attitudes of those with whom he is in contact, and how those attitudes can shape and determine his own emotional make-up and behavior.

Maturity is not only a physical but a mental process, in an intellectual and an emotional sense. An individual achieves emotional maturity to the degree that he functions rationally in decisions of living and emotionally on the less frequent occasions when the situation demands an emotional response. An individual functions maturely to the degree that he functions rationally rather than emotionally. Characteristically, the insecure and immature individual functions in short term values, fails to profit by experience, shows abnormal emotional responses, and is usually too dependent. This is the type of person loosely termed psychopathic. Dependency is characterized by an abnormal need for the approbation of others and leads to frustration and eventual hostility.

Like other neurotics, the delinquent usually needs too much the approval of others, which may seem, on the surface, to be paradoxical considering his anti-social behavior. Fearing lack of approval materially adds to the conflicts troubling him, and to compensate for the resultant feelings of low self-esteem, he often engages in further anti-social acts. Because he lacks assurance, there is a compulsive need to prove himself. In this manner he develops a never-ending chain, a vicious cycle.

Effective rehabilitation demands that this be changed, that the person be released from the unconscious drives which motivate him without his awareness. It is obvious that any experience which evokes the inherent insecurity of the individual, or serves to perpetuate the pattern of immaturity, cannot conceivably change the pattern of his behavior. What is needed is an environment that supplies security and provides experiences for maturity. These must come in addition to the usual manipulation of conscious motivational procedures, organized and well-directed morale, and direct influence of personnel. It is possible to produce significant rehabilitation with a minimum of technical equipment. By directing all efforts to produce the proper morale, it is possible through group pressures, to produce significant changes in the behavior pattern. Actually, however, this type of treatment serves to teach the individual to repress undesirable traits of character, and is not ultimately a completely trustworthy solution. Nevertheless, it has been utilized by the Borstal Institutions of England and the Penal Colonies of Soviet Russia(4). A similar type of environment plus the proper individual, psychotherapeutic approach, should be even more successful if properly organized.

All difficulties in living, no matter what the degree or the specific diagnosis, involve conflict between the individual and his culture, or in his interpersonal relations. Behavior involving interpersonal relations involves pursuit of satisfactions and security. The pursuit of satisfactions is a response to primarily biological needs. These include food, drink, sleep and rest, and the satisfaction of sexual needs. The attainment of satisfaction causes a decrease in tension.

The need for and pursuit of insecurity grow out of man's cultural equipment, and are embodied in every person. Unlike the attainment of satisfaction, the attainment of security requires the maintenance of some degree of tension. The attainment of satisfaction according to culturally approved patterns does contribute to a feeling of security. When the needs cannot be met according to cuturally approved patterns, it makes for increased tension that may be experienced as anxiety. In an effort to relieve this anxiety, the delinquent individual may exhibit further anti-social behavior. This obviously makes for the familiar vicious cycle.

It is characteristic of immature individuals that they have less ability to endure anxiety, and they frequently act out their conflicts. To reach the unconscious factors motivating this behavior, it is necessary to increase or expand the awareness of the individual. Initially, increased awareness of what is wrong in the present is required. With adequate awareness, the reasons why are eventually answered. Developing this awareness necessitates an indefinite number of personal interviews to educate the person to a new way of thinking(5). The irrationality of previous behavior patterns then becomes

more and more obvious to him, and he gradually gains the power to control emotional or irrational reactions in his living. This achievement is obviously worth more to the individual and to society than any other method of correction, and it is of specific importance in the age group of juvenile delinquents.

From the time the behavior of the delinquent becomes known to others, he is exposed to advice, suggestion, persuasion and judgment. There is no reason to believe that further efforts in this direction will accomplish the objective of changing him into a useful member of society. No matter what his specific offense, the circumstances contributing to his conditioning or apprehension, the individual is, by the very nature of his maladjustment, completely at a loss to understand the real causes for his behavior. Psychotherapy should therefore enable him to discover himself and thus lead to adequate self-assurance and self-reliance.

Delinquency implies ineffectiveness of the behavior by which the individual is pursuing the satisfactions he requires. He must eventually understand the significance of these drives toward satisfaction and security; must comprehend the significance of his past and the rôle it plays in his present behavior. Until he sees clearly an example of the way in which unresolved situations from the past color his perception of present situations, there can be no material improvement. Once this is attained, he then learns that more security is obtained by abandoning a complex security-seeking process than was ever achieved by it. He is then enabled to confront other anxiety-provoking situations in an effort to discover the factors in them which are experienced as a threat.

Psychotherapeutic interviews are directed toward the concept that difficulties in living arise from interpersonal relations. Mental health is achieved to the extent to which the individual can realize the nature of his interpersonal relations. Efforts are directed toward increasing his conscious awareness of what goes on inside himself. Specific suggestions are explained to assist him in this process, which is actually a process of increasing his ability to know consciously the way in which all the old, unconscious, dissociate patterns work to move him.

His attention is directed toward capturing, holding and formulating in words his marginal thoughts. This is one of the steps necessary to help him discover the reason-behind-the-reason for a specific behavior response. Many superficial examples are available in an interview to demonstrate the nature of marginal thoughts. For example, everyone has had the experience of feeling tense in some way or another. Our juvenile delinquent, during his interviews, is asked to search for all possible clues or reasons for his tension. He is next instructed to observe himself carefully in order to increase his conscious awareness of changes in body tension—such as changes in the quality of voice, clenching of his jaw or hands, tightening of his stomach muscles, etc. These may be the only evidence of anxiety, and when he is aware of them, he is then more able to appreciate the correlation between them and the specific situation evoking the change in tension. During interviews he is instructed to say, promptly and honestly, whatever is on his mind, without passing judgment, without censoring, and to be especially alert for any interrupting thoughts.

When he is exposed to an emotional situation that arouses anxiety or tension, he usually adopts one of two forms of behavior. He may respond overtly by acting out this conflict. After unpleasant experiences in this direction, he may attempt to suppress or repress the anxiety by ignoring it, or by telling himself not to act like a fool. He is instructed to attempt, as objectively as possible, to discover why he reacted as he did. With persistence and encouragement, he will eventually discover an entirely unsuspected motive for this reaction. The unique satisfaction evoked by this discovery will inevitably stimulate him to further efforts in this direction. In this manner the initial insight is developed. This further enables him to understand his previous tendency to indulge in rationalizations—an all too universal habit. This is a form of self-deception through justification, a process of thought which enables one to evade the real reasons behind an action. In the vernacular it is termed "kidding one's self." The eventual goal behind eliminating rationalizations—through this process of close and persistent self-investigation—is the discovery that to gain satisfactions, and

particularly security, one must have freedom of self in all interpersonal relations.

It is obviously difficult to offer a full sense of security in an institutional environment. However, much can be done to eliminate unnecessary sources of insecurity. A well-balanced, flexible program, extending from education to recreation is conducive to a high morale. And high morale, in the form of group pressure, is the most significant force in maintaining discipline. As indicated above, this group pressure can serve to force the individual to repress certain anti-social trends. But it can also serve to bring them to the surface.

It is the work with the individual himself, in addition to the proper type of institutional set-up that is of such vital importance. No greater restitution to any individual can be made than the ability to know and comprehend himself fully. Incarceration of a juvenile delinquent is almost pointless, unless an opportunity is provided to unravel and understand the twisted threads of his own, individual experience with life. No amount of observation and analysis, pressure or judgment from the outside is going to restore him. He must, himself, develop a knowledge of those factors which drive him forward in a constantly repeated and unsatisfactory pattern.

We, as members of society, must also understand and be more aware of this basic fact: anti-social behavior results when the individual has not had fundamental emotional needs adequately supplied during the impressionable periods of his life. A juvenile delinquent is searching for something he cannot find because he cannot find himself. His method of search—his acquired attitudes—can best be modified by increasing his awareness of his interpersonal relations, by giving him insight. This is the work of psychotherapy.

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STUDIES IN PRIMARY BEHAVIOR DISORDERS AND PSYCHOPATHIC PERSONALITY

II—The Inheritance of Electrocortical Activity [1]

JACQUES S. GOTTLIEB, M.D., M. COULSON ASHBY, M.A., and JOHN R. KNOTT, Ph.D.

Iowa City, Iowa

INTRODUCTION

In the course of an extended series of routine electroencephalographic examinations of psychiatric patients, there were included two groups of patients clinically diagnosed as psychopathic personality and primary behavior disorders in children. When organic neuropsychiatric conditions and epilepsy were excluded, these two groups were characterized by a higher incidence of abnormal electroencephalograms than any of the other, presumably, non-organic psychiatric conditions. An initial report(1) on 44 patients diagnosed psychopathic personality included 23 (52 percent) who had EEGs which did not meet the criteria of normal. This high incidence of electroencephalographic abnormality seemed to present an avenue of study which could possibly reveal relationships of value. In a subsequent study(2) of 68 patients, 54 percent had abnormal EEGs characterized principally by the presence of slow or very slow waves. Their distribution was radically different from the distributions for two other populations, a group of normal controls and a group of epileptic patients. Moreover, significantly greater proportions of abnormal EEGs were found when there was both a positive family history of psychosis, maladjusted personality, chronic alcoholism or epilepsy, and a personal history of cerebral trauma or severe illness than when neither of these factors was present.

Concurrent with the above studies had been one with the condition primary behavior disorders in children(3). In a series of 67 children, none of whom presented signs of organic disease or in whom an organic etiologic factor was suspected, 49 percent had electrocortical potentials which were clearly abnormal. Again, as in the case of psychopathic personality, there were significantly greater proportions of abnormal EEGs for those patients having either a family history of psychosis, maladjusted personality, chronic alcoholism or epilepsy, or a personal history of cerebral trauma or severe illness, than when neither of these factors was present.

Because of the similarities of the populations and the findings in these studies, the question of combining the conditions psychopathic personality and primary behavior disorder into one population for further study was broached. Actually the terms psychopathic personality and primary behavior disorders refer to a wide variety of maladjusted adults or children who cannot by present psychiatric criteria be diagnosed in any of the better defined categories. Thus the maladjustment in these patients was not attributable to defects in intelligence, known structural or inflammatory disease of the brain, epilepsy, psychoneuroses or psychoses. Neither were those patients included in whom the above-mentioned disorders were suspected in an incipient form. The patient chronically addicted to alcohol, although suffering from a personality fault, was also omitted.

The outspoken social maladjustment of both groups of patients, which had been either continuous or repeatedly recurrent over a relatively long period of time, showed stereotyped deviations in the moral, social, sexual and/or emotional components of their personality. In general, the clinical symptomatology allowed the inclusion of the bland

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From the Iowa State Psychopathic Hospital and the State University of Iowa College of Medicine.

and asocial, the aggressive, the inadequate, and the schizoid personality.

Since the selection of patients into these two clinical categories of primary behavior disorders and psychopathic personality was dependent then upon exclusion of other conditions and also upon description, phenomenology or symptomatology which are common, it appeared justifiable to combine these two groups into one for purposes of study. The hope is, of course, ultimately to discover an etiologic classification rather than to depend upon the present one, based essentially upon age and a description of symptoms, the so-called diagnosis arrived at by the process of exclusion.

In such a combined study of 200 patients (4), 100 each with the conditions primary behavior disorders and psychopathic personality, further statistical evaluations were obtained. There was a higher incidence of paroxysmal EEGs (14 percent) in patients with primary behavior disorders than in those with psychopathic personality (2 percent). This would suggest that more patients with pre-clinical epilepsy were included in the former than in the latter group. When both groups of patients were combined, significantly greater proportions of abnormal EEGs were found when there was either a family history of epilepsy, maladjusted personality, chronic alcoholism or psychosis than when there was no history of such. In addition, significantly greater proportions of abnormal EEGs were found when there was either a personal history of convulsions, head injury with unconsciousness, severe illness, questionable birth injury or prematurity than when there was no such history. The younger the patient at the time of the illness and the more severe the illness, the greater was the probability of abnormal electrocortical activity.

These statistical relationships suggest the operation of genetic and histogenic factors in the causation of the abnormal EEGs in these two conditions. The genetic inferences are certainly supported by current knowledge of strong hereditary characteristics of electrocortical activity. This has been demonstrated repeatedly for epileptic persons, a great proportion of the seizure-free parents of epileptic children exhibiting abnormal waves and, conversely, the seizure-free children of epileptic parents showing a considerable amount of abnormal electrocortical activity (5).

The present study has been conducted to verify empirically the assumptions pertaining to hereditary determinants of electroencephalographic abnormality in our clinical groups. To this end, the relation of the EEGs of patients and their parents was studied

METHOD

Among 160 patients with primary behavior disorders, and 139 patients with psychopathic personality, on whom EEGs had been obtained, there were 40 patients on whose fathers and mothers EEGs had also been secured, and there were 18 patients whose fathers or whose mothers (one, but not both) had been recorded. Thus, there was a total of 58 patients and 98 parents. The age of these patients ranged from 4 to 29 years, with an average age of 13. The age of the parents ranged from 27 to 61 years, with an average age of 40.

The technique of obtaining the EEGs and the criteria for the selection of the patients have been discussed in considerable detail in previous publications and are generally accepted as standard (2, 3, 4). Suffice it to say that the electroencephalograms were obtained in the usual way, but the portion of the records obtained by hyperventilation was not used in the final evaluations; that the electroencephalographic records of the parents were read independently from those of the patient-offspring; that all those above the age of 16 were classified electroencephalographically according to the scale of Gibbs, Gibbs and Lennox (6); that all those below the age of 16 were classified according to Knott's scale (3) for children.

DATA

Table 1, in the first part, indicates the percentage distribution of certain electroencephalographic patterns among groups of patients with primary behavior disorders, psychopathic personality, and the parents of a representative combined sample of these two conditions. Of the 160 patients with primary behavior disorders, 9.4 percent had paroxysmal waves, 8.8 percent very abnormal waves, and 30.6 percent slightly abnormal waves. The corresponding figures for the 139 patients in the group psychopathic personality was 1.4 percent paroxysmal, 10.1 percent very abnormal, and 46.0 percent slightly abnormal; for the 58 patients on whose parents EEGs were obtained, 1.7 percent was paroxysmal, 12.1 percent was very abnormal, and 31.0 percent slightly abnormal; for the 98 parents of the 58 patients, 1.0 percent was paroxysmal, 4.1 percent very abnormal, and 20.4 percent slightly abnormal.

Whereas the distributions for the first two groups and the combined sample from them were similar except for the increase in the percentage of paroxysmal waves for the group primary behavior disorders, the distribution for the parents differed from them. The higher incidence of the paroxysmal waves in the first group may be due to the inclusion of a small group of patients with preclinical epilepsy. The older age of the second population would have assisted in automatically excluding that type of patient. The similarity in the electroencephalographic distributions of the first two groups would suggest that the populations are related.

Table 1, in the second part, presents the percentage distribution of certain electroencephalographic patterns among normal adult controls, relatives of epileptics, epileptics and organic neuropsychiatric cases without epilepsy. These data are borrowed from Gibbs (7). The electroencephalographic distributions for these groups differ considerably. The normal control population had an incidence of 0.9 percent paroxysmal waves; the relatives of epileptics, 5.9 percent; the epileptics, 38.6 percent, and the organic neuropsychiatric cases without epilepsy, 1.2 percent. Similar differences in the percentages are apparent in the very abnormal and the slightly abnormal categories of EEGs. The distribution for the parents of offspring diagnosed primary behavior disorders or psychopathic personality most resembles the distribution obtained on normal controls. The distribution which was most similar to the

TABLE 1

THE PERCENTAGE DISTRIBUTION OF CERTAIN ELECTROENCEPHALOGRAPHIC PATTERNS

AMONG PRIMARY BEHAVIOR DISORDERS, PSYCHOPATHIC PERSONALITY, AND PARENTS OF A COMBINED GROUP OF THESE TWO CONDITIONS

Clinical group	No. cases	Electroencephalographic type: Paroxysmal	Very abnormal (S_2, F_2 or C. A.)	Slightly abnormal (S_1, F_1 or R. A.)	Questionably normal	Normal
Primary behavior disorders	160(100%)	15(9.4%)	14(8.8%)	49(30.6%)	13(8.1%)	69(43.1%)
Psychopathic personality	139(100%)	2(1.4%)	14(10.1%)	64(46.0%)	.....	59(42.5%)
Combined group	58(100%)	1(1.7%)	7(12.1%)	18(31.0%)	1(1.7%)	31(53.5%)
Parents	98(100%)	1(1.0%)	4(4.1%)	20(20.4%)	.....	73(74.5%)
AMONG NORMAL ADULT CONTROLS, RELATIVES OF EPILEPTICS AND EPILEPTICS (GIBBS)						
Normal controls, adult	1,000(100%)	9(0.9%)	11(1.1%)	138(13.8%)	.....	842(84.2%)
Relatives of epileptics	202(100%)	12(5.9%)	8(4.0%)	75(37.1%)	.....	107(53.0%)
Epileptics (all ages)	1,260(100%)	486(38.6%)	250(19.8%)	360(28.6%)	.....	164(13.0%)
Organic neuropsychiatric cases without epilepsy	418(100%)	5(1.2%)	181(43.3%)	75(17.9%)	.....	157(37.6%)

In this table and the following one very abnormal records, except for paroxysmal, are characterized by S_2, great amount of activity slower than 8½ per second in any lead; F_2, great amount of activity faster than 12 per second; or C. A., continuously abnormal, with no normal frequencies present. Slightly abnormal records are characterized by S_1, moderate amount of activity slower than 8½ per second in any lead; F_1, moderate amount of activity faster than 12 per second; or R. A., recurrently abnormal, in long bursts of several seconds.

distributions of patients with primary behavior disorders and psychopathic personality was the group of relatives of epileptics. However, the distributions for epileptics and organic neuropsychiatric cases without epilepsy differed quite radically from those mentioned above.

Table 2 presents the relationship between the EEGs of 40 patients to the combination of the EEGs of their respective parents. There were 22 pairs of parents both of whom had normal EEGs; 15 (68 percent) of their patient-offspring had normal waves, 6 (27 percent) had a mild abnormality, and 1 (5 percent) had waves which were considered very abnormal. There were 14 pairs of parents, one of whom had normal, the other slightly abnormal EEGs; 4 (29 percent) of their patient-offspring had normal electrocortical functioning, 6 (43 percent) slightly abnormal; and 4 (29 percent), very abnormal. There were 3 pairs of parents, one of whom had normal, the other very abnormal EEGs; 2 (66 percent) of their patient-offspring had slightly abnormal waves and 1 (33 percent) had a paroxysmal record. There was 1 pair of parents, both of whom had abnormal electroencephalograms, whose patient-offspring had a normal record.

TABLE 2

THE RELATION OF ELECTROENCEPHALOGRAPHIC PATTERNS OF PATIENTS TO THE COMBINATION OF ELECTROENCEPHALOGRAMS OF THEIR RESPECTIVE PARENTS

Parents' electroencephalograms		Patients' electroencephalograms			
Combinations	No. of pairs	Normal and questionably normal	Slightly abnormal (S_1, F_1 or R. A.)	Very abnormal (S_2, F_2 or C. A.)	Paroxysmal
N x N	22(100%)	15(68%)	6(27%)	1(5%)	.....
N x S_1 (or F_1)....	14(100%)	4(29%)	6(43%)	4(29%)	.....
N x S_2 (or F_2)....	3(100%)	.....	2(66%)	.....	1(33%)
P x S_2	1(100%)	1(100%)	.....	.....	.....
Total	40(100%)	20(50%)	14(35%)	5(13%)	1(2%)

In considering these data in terms of normal or abnormal, 72 percent of the patient-offspring of parents having abnormal EEGs also had abnormal waves, while only 32 percent of the patient-offspring of parents with normal EEGs had abnormal records. In applying the method of χ^2 to these data to test whether the distributions differed significantly, it was found that the level of confidence was between 1 and 2 percent. This means that the difference could be attributed to chance in only 1 to 2 out of 100 experiments and is thus statistically highly significant. Thus, one may infer that the relationship between electroencephalographic abnormality of the parents and their patient-offspring is not due to chance. From this it would seem reasonable to conclude that electrocortical activity, normal or abnormal, in patients with primary behavior disorders and psychopathic personality has an hereditary determinant.

COMMENT

The data presented add a confirmatory link to the chain of statistical evidence indicating that electrocortical activity, normal or abnormal, in patients with either primary behavior disorders or psychopathic personality has an hereditary determinant. The data do not exclude the possibility of electroencephalographic abnormality arising from other sources although the majority would seem to be genogenic in origin. The higher incidence of electroencephalographic abnormality in those patients with personal histories of severe illness or injury would suggest the operation of a histogenic factor(4).

It has also been shown that heredity is a determinant of the electroencephalographic abnormality of epilepsy. These three groups of patients, primary behavior disorders, psychopathic personality and epilepsy, should not be thought of as constituting one population for not only do the first two groups differ clinically from the third, but electroencephalographically as well. That they might be related populations, could be postulated on the basis of a high incidence of electrocortical abnormality which, substantially

at least, is genetically determined. The kind and type of relationship awaits the analysis of additional data.

Irrespective of any relationship that may exist among these groups, epilepsy, primary behavior disorders and psychopathic personality, the meaning of the EEG in the latter two conditions becomes clear. The abnormal EEG is inherited in the majority of instances but may be acquired in the minority through the operation of histogenic experiences. As we have suggested before, the conditions diagnosed primary behavior disorders or psychopathic personality may be divided into two: those with normal electrocortical activity and those with abnormal electrocortical activity. The implication then, in general, is that the group with abnormal electrocortical activity has either a positive specific inheritance or has experienced at some time severe ill health, the latter not necessarily revealed through any clinical signs. The group with normal electrocortical activity has an inheritance of a different order and has had relatively good personal health. It would seem likely, therefore, that there may be some correlation between electroencephalographic activity and the structure of the personality, or the symptomatology in these clinical conditions. Such correlative studies are now in process.

SUMMARY

1. The electroencephalographic distributions for 160 children with primary behavior disorders, 139 adults with psychopathic personality and 98 parents of 58 patients were presented.

2. These were contrasted with the electroencephalographic distributions reported by Gibbs(7) for normal controls, epileptics and relatives of epileptics.

3. The electroencephalographic distributions of the parents of the patients approached the one for normal controls; those for primary behavior disorders and psychopathic personality were most similar to the one for relatives of epileptics but radically different from the one for epileptics.

4. The EEGs of 40 patients with either primary behavior disorders or psychopathic personality revealed a highly significant relationship to the combination of the EEGs of their respective parents.

We wish to thank Dr. F. A. Gibbs for his kindness in permitting us to use his data.

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HERPES SIMPLEX AND SECOND DEGREE BURN INDUCED UNDER HYPNOSIS

MONTAGUE ULLMAN, M.D.[1]

Despite the existence of a growing body of literature concerning skin changes induced under hypnosis, reports of this type still meet with some degree of skepticism among medical men. Dunbar(1) surveyed the literature from 1910 to 1933 dealing with the psychogenicity of various dermatological disorders. Pattie(3), in his review of the literature on the production of blisters under hypnosis from 1885 to 1940, states that "in the last 55 years there have only been ten articles written in which investigators have reported the formation of blisters and given a reasonably full account of their procedure and control of the subject." He concludes that further experimental findings are needed to fully establish the phenomenon. Only by the reporting of *bona fide* experiments carried out under careful test conditions can skepticism be dispelled and the way paved for more fruitful investigation. It is with this in mind that the following report is submitted.

Clinical Report

The patient was a 27-year-old soldier of Swiss nativity. His past history was essentially negative for any physical disorders. Prior to the present episode he had never experienced any overt neurotic difficulties. In civilian life he earned his living as a circus parachutist. When the war broke out in Europe he volunteered in the French Army and fought for a time in Africa. He suffered a bayonet wound in his right wrist in an encounter with an Arab. He came to the United States in 1941 and soon thereafter enlisted in the American Army.

The history of his present illness had to be reconstructed from the information on his medical record. He stated that on December 21, 1944, he became blind immediately following an explosion of a shell not very far distant from him. He was taken to a clearing company where the only pertinent information noted was that he was suffering from a bilateral loss of vision, probably as a result of a nearby shell explosion. He was then transported to an evacuation hospital, December 27, 1944. Here it was noted that the original injury occurred at 0700, December 21, 1944, in the vicinity of Bastogne, Belgium, following the explosion of an enemy phosphorus shell. The diagnosis was changed to hysterical blindness although it was felt that optic neuritis should be ruled out. The patient was sent to a field hospital, December 29, 1944, and to a general hospital in the Paris area January 1, 1945, where the present studies were carried out. He was admitted to the eye service. The ophthalmologist concurred in the diagnosis of hysterical blindness, bilateral, and the patient was transferred to the neuropsychiatric ward, January 3, 1945. General physical and neurological examinations were negative except for the functional loss of vision.

Hypnosis was attempted successfully on the day of admission to the ward. The procedure was as follows: The patient was asked to sit back in a comfortable chair in a relaxed position and with eyes closed. He was then given repeated suggestions pertaining to sleep. After twenty minutes he appeared to be in hypnotic trance and was made to re-enact his recent battle experience. At the first suggestion that he was again on the battle field there was a sudden change in his demeanor. He became extremely tense, grasped the arms of the chair and began to writhe backward, as if in an effort to seek cover. When told that the shell was exploding he tried to lunge toward the floor. At this point the examiner made an effort to terminate in gradual fashion the abreaction and to lend reassurance. The patient was repeatedly told that he was completely cured and had fully regained his vision. At the termination of this first hypnotic session he was able to see normally for the first time since the onset of his illness. He recalled nothing

[1] The author wishes to acknowledge the assistance of Major Henry Laven, M.C., A. U. S., in carrying out the experiments described in this paper.

of what had happened during the treatment and was quite amazed at his ability to see again.

At subsequent hypnotic sessions the procedure was essentially the same except that the time for induction was gradually reduced so that after the third trial the patient went under in a minute or less. All the sessions were characterized by complete amnesia for events which occurred while under hypnosis.

The experiments to be described were carried out in the presence of at least one other medical officer and more often two or three in addition to the ward nurse. On January 8, 1945, while under hypnosis, a second degree burn was induced on the dorsum of the patient's left hand in the following manner: Both hands were carefully examined and no abnormality was noted. The patient was again made to re-enact his battle experience, and at the point where the shell exploded he was told that a small particle of molten shell fragment glanced off the dorsum of his hand. Coincident with this, the examiner gently brushed the dorsum of the patient's hand with a small flat file (of the type commonly used in opening ampules). The file was at room temperature. There was immediate pallor in a circumscribed area about one centimeter in diameter at the point where the file made contact with his hand. After a period of twenty minutes a narrow red margin gradually developed about the area of pallor. Hypnosis was terminated at this point. On awakening, the patient appeared puzzled and asked if he had been smoking while asleep. He complained of pain in his hand and said that he felt as if he might have burned himself with a cigarette. One hour after the suggestion had been given early blister formation was noted. The patient had remained under the observation of the author and another medical officer (Major Laven) for this entire period of time. The patient was then dismissed and from the window of the office the examiner noted the following: The patient left the building to go to the mess hall. He stepped outside, picked up a handful of snow from the ground, and proceeded to rub it on the burn in an apparent effort to relieve the pain. The patient was examined in the afternoon, approximately four hours after the initial suggestion had been given. At this time a full blister about one centimeter in diameter was noted. The patient was not under observation from the time he left the ward to the time of his return that afternoon. When questioned on his return, he could recall nothing relevant to the experiment other than the incident just described in which he applied a handful of snow to his hand. He said he did this just once, and kept the snow on his hand for only a few seconds. The following day the superficial skin had sloughed off, leaving a raw, denuded area beneath. This healed completely in the course of the following three days without leaving a scar.

On the day following the above experiment hypnosis was again induced in the presence of several members of the medical and surgical staff. While in hypnotic trance the patient was told that whereas his right hand would remain normal, his left hand would be completely anesthetic and also completely drained of blood. With a calibrated stylet of the type commonly used in taking blood counts and with the blade drawn up for maximum depth, one of the members of the medical staff stuck the middle finger of the patient's right hand. The patient winced, drew back, and droplet formation of blood immediately occurred. The same finger of the left hand was then punctured in exactly the same manner. The patient showed no signs of pain and seemed completely unaware of what had been done to him. In addition, no blood emerged from the puncture site.

During this same hypnotic session the patient was told that in the course of the next twenty-four hours fever blisters would form about his lower lip in the right-hand corner. This was accompanied by repeated suggestions to the effect that he appeared somewhat rundown and debilitated as a result of his recent experience. He was also told that he felt as if he were catching cold. At the time there were no evidences of any respiratory or other infection, nor of any incipient herpes or other lesions about the mouth. On the following morning, twenty-four hours later, there were multiple small blisters about the lower lip in the right-hand corner. The occurrence of one large blister and satellite smaller blisters at the mucocutaneous junc-

tion resembled an ordinary herpes in every way. The skin consultant who saw the patient at this time without knowing the history made a diagnosis of herpes simplex. During this twenty-four hour period, the patient remained on the ward and was at all times under the observation of the ward nurse or wardmen. He was not aware that the herpes was in any way related to the session of the previous day.

The burn effect on the hand simulated a true burn more closely than an urticarial wheal in the time it took to develop and the subsequent necrosis and sloughing off of epithelial tissue. With regard to this experiment, it should be pointed out again that the patient was not under observation from the time he left the physician's office to go to the mess hall up to the time of his return to the ward that afternoon. There is therefore only his word for the fact that he was unaware of the nature of the experiment and that he in no way attempted to induce a self-inflicted lesion. The observers noted the appearance of an early blister prior to the time the patient left the building. It was not felt that the application of the snow had any effect on the appearance of the full blister, although the possibility must be recognized that had the patient applied snow more vigorously or more often than he admitted, the physical trauma might have hastened the full development of the blister. The vasomotor control illustrated when the skin was punctured without ensuing bleeding is a well-known phenomenon capable of being elicited in many hypnotic subjects. The occurrence of what appeared to be a true herpes simplex (biopsy and histologic examination were impracticable at the time) is of interest.

It is felt that a definite affective change was brought about as a result of the suggestion that the patient was feeling tired, rundown and out-of-sorts, and that this was a necessary concomitant for the development of the herpes. This is in accord with Hull's (2) report of an experiment in which the herpetic blisters were induced in the hypnotic state by suggestion of an emotionally unpleasant experience in addition to direct suggestions concerning the herpes.

Whereas it is true that the explanation of these effects, particularly the blister formation and occurrence of herpes, is obscure, the author nevertheless feels that there is sufficient evidence to warrant acceptance of their production under hypnosis as a fact. In our present state of knowledge of neurophysiology it is difficult to speculate as to the mechanisms involved. There are many details lacking in the story of how the affect induced under hypnosis is interpolated at the various levels of integration of the central nervous system and exerts a specific effect on a circumscribed peripheral area. That the effect may be the result of antidromic impulses carried by posterior root fibers resulting in the liberation of H substances and wheal formation sheds little light on our understanding of the basic process. It is felt that further use should be made of the hypnotic technique as an experimental means of gaining insight into the relationship of psychic and physical processes.

Summary

A 27-year-old combat soldier was admitted to a general hospital overseas because of hysterical blindness. He proved to be a good hypnotic subject and vision was restored after one session. In a subsequent hypnotic session a second degree burn with blister formation was induced on the dorsum of one hand. The blister was noted at the end of one hour and was fully developed approximately four hours later. A herpetiform lesion, clinically similar in all respects to a true herpes simplex, was made to appear in a specified area about the mouth twenty-four hours after the suggestion was given under deep hypnosis. In both instances there was an attempt made to induce affective changes in addition to the direct suggestions given. Under hypnosis it is possible to demonstrate an inter-relationship between the psychic processes and localized peripheral effects which far transcends the ability of the individual in the conscious state.

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PHOBIA AS A SYMPTOM IN HYPERTHYROIDISM

BERNARD J. FICARRA, M. D.,[1] AND RALPH A. NELSON, PH. D.[2]

Brooklyn, N. Y.

In a previous study of patients with hyperthyroidism at the Lahey Clinic, one of us (B.J.F.) called attention to the close association between psychosomatic symptoms and borderline hyperthyroidism(1). The fine differentiation between true hyperthyroidism and chronic fatigue or neurocirculatory asthenia was stressed. Additional observation of patients in thyroid crisis brought to light the frequency of mental symptoms in hyperthyroidism(2). These experiences stimulated an interest in the unusual complaints manifested by patients with severe hyperthyroidism.

During the past two years 115 hyperthyroid patients were carefully questioned as to the presence or absence of phobias.[3] No leading questions were asked; the only suggestive questioning was, "Are you very nervous?" By careful interrogation the presence of phobias was elicited without difficulty. These phobias were accordingly grouped as follows:

Type of phobia	No. of cases	Sex	
		M	F
Claustrophobia (fear of confined places)	45	2	43
Monophobia (fear of being alone)	22	..	22
Ochlophobia (fear of crowds)	15	1	14
Acrophobia (fear of high places)	14	..	14
Anthrophobia (fear of men)	5	..	5
Gynophobia (fear of women)	4	4	..
Hematophobia (fear of blood)	2	..	2
Nyctophobia (fear of the dark)	2	..	2
Zoophobia (fear of animals)	4	..	4
Taphephobia (fear of being buried alive)	1	1	..
Astraphobia (fear of thunder)	1	..	1

From this survey it can be appreciated that phobia in excessive thyroid metabolism is not rare. It may easily be overlooked if the physician fails to recall that mental symptoms are often present in patients with hyperthyroidism.

Our study indicates that the most frequently encountered fear is claustrophobia. We remember quite vividly a 26 year old white female with severe hyperthyroidism She developed a Bell's palsy for which diathermy was advised. It was impossible to treat her because she could not tolerate the diathermy pads on her face. The pads gave her a sense of crowding and frightened her similar to being in a closed room. She was quite intelligent, a college graduate, and volunteered the information that she had claustrophobia.

The second most common phobia in this series was the fear of being alone. Twenty-two of the patients studied offered this complaint. One middle-aged lady could not remain in her own home alone. When forced to do so, she would telephone her friends and talk for hours in trivial conversation. Following thyroidectomy, she became a tacit matron.

The opposite situation was observed in 15 persons. These individuals feared crowds and preferred to remain at home. This phobia often resulted in a pallid complexion, because of the lack of sunshine. Most of these persons would venture out of the house only in the darkness of evening.

Fourteen patients had acrophobia. One patient, a 38 year old housewife, lived in an elegant five room sixth floor apartment overlooking the river. Her fear of high places was so severe that she would not look out the window although the view was most beautiful. She constantly quarrelled with her husband since she wanted to move out of the apartment. The scarcity of living accommodations was the source of the familial discord.

A fearful dislike of the opposite sex was unfolded in 9 cases. Five women and 4 men were so afflicted. A patient, recently seen in consultation with an internist, could not eat

[1] Assistant Visiting Surgeon, Kings County Hospital and Holy Family Hospital.

[2] Psychologist, Holy Family Hospital.

[3] Many of the cases studied were observed by the senior author during his Fellowship in Surgery at the Lahey Clinic, Boston, Mass.

in the presence of a woman. He could not give the reason for his behavior but it was a constant experience. One day his buddy invited him to his home for dinner. He was assured that no women would be present. During the course of the dinner, the friend's young married sister arrived unexpectedly; his appetite left him immediately. He could not take another mouthful of food. Following adequate thyroid surgery, he married, eventually becoming a proud father.

Other types of phobias in these patients were fear of blood, fear of the dark, thunder, and fear of animals. A most interesting hyperthyroid person was a middle aged man who had taphephobia. His fear of being buried alive was so fixed in his mind that he left instructions in his will for an autopsy on his body. Another patient had violent fear of thunder. During a rain storm she would hide under her bed or run down the cellar to hide until the storm subsided.

Two patients exhibited intense fear of blood. Both were young women; one of whom became frightened at her own menstrual flow. As time went on she commenced to dislike herself because she menstruated. Over a period of months she developed a hatred of menstruation as a womanly trait. Finally a homosexual temperament and characteristics became manifest. The other female patient feared the sight of blood to an unprecedented degree. She refused to eat red meat because of the blood. Fainting at the sight of someone bleeding was a common experience with her. In spite of this she adapted herself well to her menstrual cycle. Following thyroidectomy and prolonged psychological therapy her hemophobia disappeared.

Summary and Conclusions

One hundred fifteen hyperthyroid patients were studied from a psychological viewpoint. The presence of phobias was discerned to be a presenting symptom. The majority of patients presenting phobias were women. Eight men were found to have this complaint. In almost all cases the combination of thyroidectomy and intensive psychotherapy resulted in a disappearance of the phobia. This survey argues for an adequate history-taking of patients suspected of possessing a phobia or presenting it as a major complaint. To label such persons as neurotics, neurasthenics or psychasthenics may be an injustice.

Additional information, an adequate physical examination and laboratory studies should be made to rule out underlying thyroid disease. In the particular field of hyperthyroidism the close cooperation of the surgeon and a competent psychologist often reaps a worthy reward. This cooperation on many occasions has saved the neurotic patient from a needless thyroidectomy; even as the surgeon's scalpel has eliminated prolonged psychological treatment of patients with hyperthyroidism.

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CASE REPORTS

A CASE OF ATABRINE PSYCHOSIS IN A CIVILIAN[1]

FELIX H. OCKO, M. D., NEW YORK, N. Y.

A review of the recent literature on atabrine psychosis reveals that the majority of reports stem from military medical establishments. With the low incidence rate reported, it is even more rare to see a case in a civilian in the United States. Newell and Lidz(1) reported two cases per 10,000 men treated with atabrine, a total of 28 cases. All but 2 received more than 0.3 gm. daily for 7 days. When the total dosage was decreased, the incidence of toxic cerebral symptoms was even less. They declare there is a definite relation between the rapidity of administration, size of dosage and production of a psychosis. Two cases who did not recover were considered schizophrenics, precipitated by the illness or therapy. In several controls the condition cleared when atabrine was withdrawn, recurred when it was resumed and cleared again when the drug was again withdrawn. In all the onset was sudden, with a picture of confusion with clouded sensorium. All but one case had tertian malaria. The treatment was discontinuance of the drug, forcing fluids, sedation and psychotherapy. Sheppeck and Wexberg(2) reported 19 atabrine psychoses in 4876 cases of malaria treated by atabrine. The incidence was higher in estivo-autumnal than in tertian malaria. They consider the psychosis not specific, corresponding to other toxic psychoses, with the prepsychotic personality probably accounting for the variations, such as manic, catatonic, paranoic or hallucinatory. Onset usually occurred approximately 2 days after the fever had subsided and no more parasites were found in the blood. Recovery was the usual outcome after discontinuance of the drug. There was no evidence that the dosage was responsible for onset of the psychosis, and individual idiosyncrasy or tolerance was considered to be the important factor. One fatal case of quinacrine toxic delirium was described, with no significant findings at the autopsy. Burnham(3) reported a case of a sailor who took 90 grains of atabrine with suicidal intentions. Recovery was complete without any apparent liver damage. In the Australian army(4) a 0.1% incidence was reported, 35 cases of 7604 malaria patients treated with atabrine. Treatment was palliative and all but 2 cases recovered within 23 days. Subsequently half of these patients were again given atabrine without reactions. Mergener(5) reported one psychosis in a series of more than 1000 cases of atabrine-treated malaria. This was at first considered a cerebral malaria and the patient was placed on quinine. Complete recovery took place in 14 days. Two reports from the German literature(6, 7) give a comparable incidence. In both reports it is stated that treatment of the malaria was not interrupted, since it was not considered responsible for the mental symptoms.

CASE REPORT

A 23-year-old white female, born in the Dominican Republic, 3 months resident in the United States, was admitted to the medical service of the Bellevue Psychiatric Hospital, 21 November, 1946 from a general hospital, where she had been a patient for 24 hours. The accompanying report stated that she had been extremely agitated, hyperactive, shouting and impossible to control. When first seen by the writer the patient was heavily sedated with sodium amytal. Physical examination revealed a slender young woman with a slight atabrine discoloration. Temp. was 98.6, pulse 84, respirations 20 and B.P. 110/70. Findings were generally negative, with no splenic enlargement, no adenopathy, no jaundice. The next morning the patient was thrashing about in bed, pulling out of wrist and ankle restraints and tearing wildly at any clothes or bed coverings. She was constantly shouting and shrieking in Spanish, in a hoarse tone. She did not respond to any questions but appeared to recognize the presence of the examiner. Typical productions were: "I am dead, dead, dead. I have been dead for 5 (holding up 5 fingers) days, 5 weeks, 5 hours, 5 minutes. I am dead, dead, dead, they cut open my

[1] From the Psychiatric Division of Bellevue Hospital and the Department of Psychiatry, New York University College of Medicine.

chest and took out my heart. It was a diamond, my heart, it is dead. I can no longer breathe, I am dead. My mother is gone, gone, mother, mother, mother, my father is dead, dead, dead, my father, my father, my baby, is dead, my baby, dead, dead, dead. Hitler, Hitler, Hitler, H-I-T-L-E-R, Trujillo, Trujillo, Truman, Truman, no want me here, Trujillo, Trujillo." Urinalysis was normal, the white blood count was 8,500 with 3 monocytes, 39 lymphocytes, 53 polymorphs and 5 transitional cells. The blood smear was negative for plasmodia.

The patient was so agitated that it was necessary to keep her under practically continuous sedation. When this was temporarily discontinued the patient presented the same picture as described above. This continued unchanged for 9 days and it was necessary to transfer the patient to the disturbed ward. Treatment was generally supportive. On the morning of the tenth day following admission the patient awoke completely clear of the psychosis; she was cooperative, quiet and was able to speak coherently and relevantly in her native tongue. She was quickly oriented as to time and place, and had a partial amnesia for the entire episode, stating that she remembered seeing the examiner and trying to tell him something.

History revealed that the patient had had an attack of tertian malaria in Santo Domingo 5 years previously. Two months after her arrival in the U. S., she developed daily attacks of fever and when the local district health center reported a positive smear, performed on November 14, she was given atabrine by her local physician, starting on November 16, with instructions to take one pill t.i.d. for 3 days, then one a day. On the 16th she took two atabrine tablets, and on the 17th she took the remaining 22 tablets, thinking those were the directions. Two days later she developed progressive irritability, depression, and was seen at the Vanderbilt Clinic with a temperature of 100, WBC of 14,600 with a normal differential. A thin smear showed no malarial parasites. Physical examination at that time was negative. Forced fluids and mild sedation were prescribed with instructions to the family to take her to Bellevue if the symptoms did not clear promptly. She was hospitalized the next day, and was discharged from Bellevue, November 30, recovered.

This case is reported to call attention to the possibility of its occurrence to practitioners who may be seeing more malaria than in the pre-war period.

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SHOCK THERAPY IN PSYCHOSES DURING PREGNANCY

Report of One Case [1]

CARROL C. TURNER, M.D., F.A.C.P., and LEONARD D. WRIGHT, M.D.

This case is thought to be of interest because of the paucity of literature on the use of shock therapy in psychoses complicated by, or during pregnancy.

Gralnick(1) reports 2 cases treated with the combination insulin and electroshock, with stillbirth (macerated fetus) in both cases. McConnell(2) reports the same experiences in 2 cases by using insulin coma. Goldstein, Weinberg and Sankstone(3) report one case using the combination insulin and electroshock without injury to the child. Polatin and Hoch(4) treated 2 cases with electroshock that terminated in the delivery of normal babies. Sands(5) treated 2 cases by electroshock without injury to either of the babies.

The use of supplementary medication, such as pentothal and curare, has not yet been reported. On the basis of the reported cases, and the one that is to follow, it is not yet possible to draw any definite conclusions as to the safest method of treatment in these cases.

[1] From the Carrol Turner Sanatorium, Memphis, Tennessee. A preliminary report on this case was read before the Memphis and Shelby County Medical Society, February 18, 1947.

Case Report

Mrs. B. W., age 22, white, 4 months pregnant, was admitted to the Carrol Turner Sanatorium

March 7, 1946. In the early part of pregnancy she suffered a moderate amount of nausea and vomiting. During the week prior to admission she had lost about 7 pounds in weight. There had been no unusual rise in blood pressure, edema of the ankles, headaches, visual disturbances, abnormal urinary findings, or symptoms of a polyneuropathy.

The patient had received a telegram the week before admission that her favorite uncle had died, and she seemed somewhat depressed over this. She had also begun to worry considerably over the conduct of a sister, whose husband had been killed overseas, and who had put her child in a Catholic institution. There were no abnormal mental symptoms prior to March 4, at which time she was playing cards and suddenly threw down the cards and ran upstairs crying. She was notably depressed and had difficulty in sleeping that night, and remained in bed the following day. For the next 2 days she continued to be depressed, tearful, and refused to eat. She was admitted to the sanatorium 4 days following the onset.

Past History.—Birth and early development apparently normal. The mother died when patient was 4½ years of age. As a child she was outgoing and mischievous and was not shy or sensitive. When she was 7 years old the father remarried, and she was apparently very fond of her stepmother. The father was a Jew, who was Presbyterian in religion. The mother was a Catholic and the stepmother a Reformed Jew. When the patient was 9 years of age, her father died, and she, with her stepmother, went to live with an uncle and aunt. Patient appeared happy there and made excellent grades in high school. She had planned to go to college, but during the Christmas holidays preceding graduation she met the man who is now her husband. They were married in 1941. This man was of the Jewish faith and she adopted his religion. Immediately after marriage she became pregnant. When 6½ weeks pregnant, she and her husband decided that it was too early to have a child, and an abortion was performed. No complications resulted. They were happy, except for the fact that the mother-in-law, a domineering, strong-willed type of individual, evidently influenced their marital life too much.

Physical Examination and Laboratory Procedures.—The blood pressure was 135/90. Pulse, 80. A normal 4-months pregnancy. Repeated urinalyses were normal. C.B.C. was normal.

Psychological Examination.—March 8, 1946, psychological examination reported an I. Q. of 82, dull normal.

Treatment and Course in Hospital.—On admission the patient was ambulatory, depressed, tearful talked of suicide, but suddenly changed to a mute, catatonic-like state, with refusal to eat. Treatment was begun with tube feedings, intravenous glucose, high vitamin therapy, hydrotherapy, and sedation. During the next 2 days the patient varied from a mute catatonic-like state to that of a confused state with hyperactivity, hallucinations, and delusions.

After two feeble attempts at suicide, we advised shock treatment, although there was a possibility that complications, such as spontaneous abortion, or the birth of a dead fetus should the patient go to term, might follow shock therapy. The family considered these possibilities and readily agreed to shock, as the case had become more desperate.

Electroshock therapy, without the use of insulin, was instituted on March 11, 1946. From this time to April 23, 1946, 17 treatments were given at 1 to 3 day intervals, without apparent damage to the mother or the child.

The following notes from her chart describe the patient's condition during this period:

March 15—Psychological examination revealed improvement in I. Q.
March 17—Patient in a stuporous, catatonic-like state.
March 19—Patient pleasant, sociable, and showed normal interest.
March 21—Fetal movements were first noted.
March 22—Normal behavior. Intelligence test I. Q. 100.
March 23—Patient exhibited confused and weeping periods.
March 31—Bright, cheerful, but bordering on silly behavior.
April 5—Confused and delusional.
April 11—Manic excitement. Accusatory, abusive, and hallucinatory.
April 17—Manic excitement, confused, hallucinatory, delusional and an attempt was made to escape from the sanatorium.
April 18—Patient apparently normal and allowed more privileges. A visitor arrived at the sanatorium in taxi. Patient got into taxi and instructed driver to take her to her stepmother's home in Memphis. Her behavior during this short visit was within normal limits and patient was returned after a pleasant visit.

Following this episode, the patient's progress was satisfactory. She was complacent and exhibited entirely normal behavior. On April 27, she spent the week-end with her husband and returned on April 29 at which time he removed her from the sanatorium.

Progress after Discharge from the Sanatorium.—On May 8, patient's stepmother reported that her behavior was perfectly normal. The only observation of abnormality was the fact that she seemed quiet and less active than prior to her psychotic episode.

On February 6, 1947, a letter from patient's uncle, who is a doctor, reported the following:

"Following her discharge from the sanatorium, she has progressed rapidly. Her mind has been clear and quick, though I did notice a mild depression at times, which lasted only momentarily.

On August 8, 1946, a five pound, twelve ounce girl, perfectly normal, was delivered by Caesarian section. At this time both tubes were ligated and cut. She made a remarkable recovery, and there has been no depression whatsoever since delivery. She has been a wonderful mother to her baby and is already talking about having another child.

The baby is bright, well trained, has one tooth, and can almost sit alone (six months)."

Summary.—One psychotic pregnant female was treated by electroshock therapy between the fourth and sixth months of pregnancy, without the use of supplementary medication. A total of 17 treatments, with major convulsions, was given. This patient went into labor at the normal time, and a normal baby girl was delivered by Caesarian section. At this time procedures for sterilization were carried out, at the request of her husband.

Follow-up in this case reveals a normal, healthy infant and a mother who has, apparently, fully recovered.

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COMMENT

PIERRE JANET

The recent death of M. Pierre Janet at 87 has removed one of the world's greatest figures in psychological medicine.

His family circle had been sadly disrupted during the war; he had lost his wife, his brother Jules, and his cherished son Michel; but his calm spirit did not falter; "Nous avons vécu tout de même," he wrote to Dr. William Russell, "et nous nous retrouvons, peut être, espérons le, pour une meilleure période."

Janet is best known through his masterly discussions of hysterical states and the obsessional neurosis which he explained as due to a general weakening of psychic activity or lowering of psychological tension. It is particularly in his psychological analysis of the neuroses that the work of Janet achieves historic significance, as Henri Ey points out, in establishing the transition from the nasographic systems of the 19th century to the so-called dynamic concepts of the 20th; and it is profitable to keep in mind his fine and conservative exposition of psychic events, unexcelled by any later writers. Worthy of quotation and underlining is his comment on the arbitrary and artificial separation of neuroses and psychoses. This differentiation, says Janet, may be "convenient in practice but is absolutely false from the clinical point of view. . . . . The distinction may be acceptable to the police magistrate but is of no interest to the physician."

From his early experiments with hypnotism, while professor of philosophy at the Havre Lyceum, and his remarkable demonstration of manipulating at a distance the mind of the famous subject Léonie, down through his work at the Salpêtrière, where he was director of the psychological laboratory, his professorship at the Sorbonne, and eventually at the Collège de France, Janet had become the dominating figure in French psychology and psychiatry.

Primarily a psychologist (he had received his doctorate in philosophy at the age of twenty-three) he later took his degree in medicine, and was thus exceptionally qualified for teaching and research in both normal and abnormal mental states.

To commemorate the opening of the new medical school buildings at Harvard University in 1906, President Eliot and Dr. J. J. Putnam, professor of diseases of the nervous system, invited Professor Janet to Boston to deliver a series of lectures on psychopathology. These lectures, some of which were also given at Johns Hopkins and Columbia Universities, were brought together in his well-known monograph "The Major Symptoms of Hysteria" (1907). The keynote, as he put it, was to show "how the study of the mental state of the patient can sometimes be useful to explain many disturbances and to give some unity to apparently discordant symptoms." Janet's definition of hysteria will be recalled, "Hysteria is a form of mental depression characterized by the retraction of the field of personal consciousness and a tendency to the dissociation and emancipation of the systems of ideas and functions that constitute personality."

His monumental and authoritative treatise on psychotherapy, which appeared in France in 1920 and has been translated into English, is a standard work of reference.

The loss of this great French scientist is keenly felt on this side of the Atlantic where he had many friends and followers. His youthful spirit will continue to inspire. He could have left no finer testament: "Il faut continuer a travailler pour remplir la vie, et il faut nous intéresser au travail des jeunes."

C. B. F.

UNESCO AND THE AMERICAN PSYCHIATRIC ASSOCIATION

The first National Conference on UNESCO, sponsored by the United States National Commission, was held in Philadelphia March 24, 25 and 26. Five hundred national bodies, among them the American Psychiatric Association, were invited to send representatives.

The United Nations Educational, Scientific and Cultural Organization (UNESCO) is one of the special agencies set up by the Economic and Social Council for the purposes of attacking illiteracy throughout the world, to facilitate better educational methods, to assist those countries most in need to revive their damaged educational facilities, to remove barriers to international communication in its various forms, to assist with scientific development and exchange of scientific knowledge, to develop a better understanding of the cultural traditions and philosophies of other countries, and to study and ameliorate social tensions between nations which are conducive to war or prejudicial to peaceful international development.

The opening session was held in the Irvine Auditorium of the University of Pennsylvania and was presided over by Milton Eisenhower, chairman of the U. S. National Commission for UNESCO. Addresses delivered at this time and on the following night by distinguished speakers reviewed the history of the events that led to the founding of UNESCO, outlined the projects to be undertaken, and challenged the audience and the 500 national bodies there represented to grasp the importance of the problems UNESCO will attempt to solve, and expressed the hope that this increasing knowledge would lead to sustained effort on the part of all to work as diligently and optimistically for the winning of peace as had been done to win the war.

The second day of the conference was devoted largely to sectional meetings in which the representatives had their opportunity to contribute to the discussion. President Samuel W. Hamilton nominated Dr. George H. Stevenson, chairman of the Committee on International Relationships of the American Psychiatric Association, to represent the Association at this conference and he attended the meetings of the section considering social tensions conducive to war. It was pointed out that the psychiatrist has a real and important interest in this field because of his experience with emotional tensions in individuals, at both the conscious and the unconscious levels. The effects of emotional disturbances on thinking and behavior in the individual and his social adjustments and maladjustments were emphasized as well as their counterparts in small groups and larger groups which are designated as nations. It was suggested that the methods of psychiatry in dealing with emotional difficulties and the sublimation of aggressiveness might be used advantageously in this study. The dependence of people on leaders and the need for an educated, broad-minded and ethical leadership were also stressed, because of the constant danger to the peace of the world if leadership is in the hands of fanatical, poorly trained or badly adjusted persons.

The social sciences are broadly represented in UNESCO—sociology, philosophy, psychology, religion, education, anthropology. The joint contributions of all these divisions, along with the contribution of psychiatry, should enable definite progress to be made in the improvement of the interpersonal relationships of people who speak different languages or who live on opposite sides of imaginary lines. Our Association is urged to give active support to the policies of UNESCO, and each member is invited to assist by submitting suggestions to the Committee on International Relationships, to be passed on to the UNESCO secretariat.

On the third day of the conference, the suggestions emanating from all the section meetings were ably summarized by Howard Wilson of the Carnegie Endowment for International Peace. It was indicated that the American Psychiatric Association would be consulted from time to time as UNESCO's program developed.

NEWS AND NOTES

VETERANS ADMINISTRATION NEWS.—Veterans Administration has estimated the nation's veteran population on February 1 to be 18,277,000, of whom 14,341,000 are World War II veterans.

Sites now have been selected for 68 of the 75 new hospitals which Veterans Administration is authorized to build and for which funds have been appropriated.

Approximately 5 million veterans have applied to date for education and training under the G.I. Bill.

Over 200,000 disabled veterans of World War II were in educational institutions or job training on January 31, under the Vocational Rehabilitation Act administered by the Veterans Administration.

Veterans Administration supplied disabled veterans with 437,883 prosthetic devices, ranging from arch supports to wheel chairs, during the fiscal year 1946.

Veterans Administration has approved for guarantee about $3.5 billion in business, farm, and home loans for World War II veterans. This figure was as of February 20.

The number of Civil War veterans drawing pensions from Veterans Administration dropped from 154 on June 30, 1946, to 116 on January 31, 1947.

VETERANS ADMINISTRATION NEUROPSYCHIATRIC SERVICE.—The Veterans Administration reported a total of 548,749 admissions of veteran patients to VA and non-VA hospitals during the calendar year 1946, an increase of 174,342 or 61.3% over the calendar year 1945. The greatest number of admissions, 381,619 or 83.19% of the total, were general medical and surgical patients. Next were neuropsychiatric patients, amounting to 11.77% of the total, or 53,981 admissions. Smallest group was tuberculosis patients, who numbered 19,609, or 4.27% of the total. Slightly less than 50% of the total number of neuropsychiatric admissions, or 26,509 out of 53,981, were classified as psychotic cases.

Although neuropsychiatric patients in 1946 accounted for only about 12% of all admissions, nearly 55% of the total number of beds available in VA and non-VA hospitals are generally reserved for neuropsychiatric patients; on any single day, VA's total patient load includes nearly 53% neuropsychiatric cases.

The great disparity between the comparatively small number of neuropsychiatric patients admitted to hospitals, the number of beds set aside for their use, and the heavy day-by-day load of such patients results from the long periods these patients must spend in hospitals under treatment. This causes a much slower turnover in beds. During the fiscal year 1946, neuropsychiatric patients discharged from hospitals had an average stay of 197 days, compared with 34 days for general medical and surgical patients and 186 days for tuberculosis patients.

PARAPLEGIC CENTERS UNDER VETERANS ADMINISTRATION.—Seven paraplegic centers in hospitals strategically located from coast to coast have been established. Dr. Donald A. Covalt, chief of VA's medical rehabilitation service, reports that these centers, especially designed to treat veterans with spinal cord injuries that result in partial or complete paralysis of the body, are in operation in VA hospitals at Framingham, Mass.; Memphis, Tenn.; Van Nuys, Calif.; Staten Island, N. Y.; Richmond, Va.; Bronx, N. Y.; and Hines, Chicago, Ill. VA personnel skilled in this field have been assembled at the 7 centrally located hospitals over the country. This will permit veterans to receive the proper treatment and at the same time to be as close to their homes as possible.

Until recent years most spinal cord injury cases were doomed to a life of inactivity. In many cases, death resulted. Today, because of modern medical science and developments in the field of physical medicine, many paraplegics are able to lead active, productive lives. To treat each case properly, the services of the following medical team are

needed: neurologist, neurosurgeon, psychiatrist, urologist, plastic surgeon, orthopedic surgeon, doctor of physical medicine, physical therapist, occupational therapist, corrective physical rehabilitation officer, educational retraining officer, prevocational shop supervisor, social worker, and nurses.

VA has approximately 1,200 veteran patients suffering from injuries to the spinal cord. This number is expected to reach about 2,000 eventually.

AMERICAN OCCUPATIONAL THERAPY ASSOCIATION, NATIONAL CONVENTION.—The American Occupational Therapy Association will hold its national convention at Hotel Coronado across the bay from San Diego, Calif., October 31 to November 7, 1947. Special plans are being made for this convention, which marks the thirtieth anniversary of the Association.

LASKER AWARD, 1947.—This year's award of $1,000 for outstanding service in mental hygiene will be presented for the most significant contribution to popular adult education, especially in parent-child relationships, as announced by Dr. George S. Stevenson, medical director of the National Committee for Mental Hygiene. The work of the candidates for the award must have been accomplished or generally accepted during the past year or two. Presentation of the award will be made at the annual meeting of the National Committee for Mental Hygiene, to be held on November 12 and 13 in New York City.

SALARY RATES IN SOCIAL WORK.—The Russell Sage Foundation has published the report, "Scheduled Salaries for Social Work Positions in Hospitals in New York City, December, 1946." Related conditions of employment, in both government and voluntary hospitals, are considered in addition to salaries. The results of the survey, it is believed, will be immediately useful both to employing agencies and to individual social workers in evaluating present salaries. The pamphlet is available from the Russell Sage Foundation, New York City, at a price of 40 cents.

THE AUSTEN RIGGS FOUNDATION.—Dr. Robert P. Knight, at present chief of staff of the Menninger Clinic, has been appointed medical director of the Austen Riggs Foundation, Stockbridge, Mass. He will assume his duties on September 1. The Austen Riggs hospital was founded in 1919 by the late Dr. Austen Fox Riggs, for the treatment, study, and training in therapeutic procedures of the psychoneuroses.

PSYCHIATRIST, PORTLAND CHILD GUIDANCE CLINIC.—A community child guidance clinic, with the financial backing of the Community Chest, has been recently established in Portland, Oregon. There is an opening for a full-time psychiatrist and clinical director, with a salary between $10,000 and $12,000 a year. Persons interested in this position should write to the Board of the Community Child Guidance Clinic, c/o Council of Social Agencies, the Terminal Building, 12th and S.W. Morrison, Portland, Oregon.

PSYCHIATRIC DEVELOPMENTS IN CALIFORNIA.—The State of California has recently embarked upon a new and progressive program for the prevention and treatment of mental disease and mental deficiency, and preparation is under way for the construction of several new mental institutions and for the modernization of existing facilities.

The director of the Department of Mental Hygiene has appointed Dr. Lawrence Kolb, former chief of the Mental Hygiene Division of the U.S.P.H.S., to the position of deputy director, medical, to develop and administer a program of raising treatment standards to the highest possible level and generally to promote mental health in the community. A new position of director of clinical services has also been established at each one of the mental institutions. These positions carry responsibility for the supervision of medical activities in the institution and the development of a teaching and research program. The clinical directors will be relieved of administrative responsibilities as far as possible so that they may devote their full attention to the medical aspects of their work.

Each hospital is to have a psychiatric

superintendent of nurses and psychiatric nursing instructor. The central office in Sacramento will have a nurse coordinator, and these nurses together with the clinical directors of the hospitals will put on a training program for nurses and attendants. The hospitals will need additional physical therapy technicians, hydrotherapists, and occupational therapists. Each institution will have a beauty parlor for the women, and recreational and music therapy will be established. In addition to the full-time physicians, each institution will have a corps of consultants. The number of technicians, dentists, and dental assistants is being increased. The increase of services in general applies both to the mental hospitals and to the homes for feebleminded.

In addition to the hospital program, the central office is planning to carry on an educational program in mental health and to administer mental health clinics. The present legislature is expected to approve 4 additional mental health clinics to be located at strategic places. Each of these clinics will have 2 psychiatrists, 1 psychologist, 3 social workers, and 2 clerks. From these central clinics certain outlying districts will be covered at periodic intervals.

The social service program has been reorganized in order to make it more efficient by centralizing certain activities, and further expansion is contemplated. The Department hopes to establish one or two hospitals for the treatment of chronic alcoholics and to carry on research activities in this field.

The Langley Porter Clinic in San Francisco, headed by Dr. Karl Bowman, is being well supported as a research, teaching, and treatment institution. It offers an intensive 12-week refresher course in psychiatry. A similar clinic is to be established in Los Angeles in connection with the new medical school to be built there by the University of California. Los Angeles already has a well-staffed and very active out-patient mental hygiene clinic. This will be integrated with the new Langley Porter type of clinic, which will be attached to the medical school and will also take care of about 150 in-patients.

The Department of Mental Hygiene wishes to call to the attention of psychiatrists, psychologists, nurses, social workers, etc., throughout the country the fact that California has a shortage of personnel in these categories. At present positions are available for physicians and surgeons, psychiatrists, and clinical directors. Salaries range from $345 to $715 per month, depending upon experience and training. Veterans applying will receive special consideration for appointment and will receive extra credit in civil service examinations. Physicians who are licensed in any other state may practice in a California mental institution for one year before securing their California license. Inquiries should be addressed to F. E. Kline, State Personnel Board, 401 State Building, Los Angeles, Calif.

ALCOHOL STUDIES, CORNELL UNIVERSITY MEDICAL COLLEGE.—The Research Council on Problems of Alcohol, an affiliate of the American Association for the Advancement of Science, has undertaken to finance at the New York Hospital and Cornell Medical Center a 5-year $150,000 research project directed mainly to the causes of alcoholism. The research work, which will be done by members of staff of both the New York Hospital and the Cornell University Medical College, will continue and expand studies that have been carried on by the two institutions during the past 5 years. It will be under the direction of Dr. Oskar Diethelm, director of the Payne Whitney Clinic of the New York Hospital.

MENTAL HYGIENE IN BUENOS AIRES.—Dr. Abraham Mosovich reports the establishment in Buenos Aires, under his direction, of a new mental hygiene clinic, organized according to American standards. The staff includes 3 psychiatrists, 2 pediatricians, 2 psychologists, 2 clinicians, 1 endocrinologist, 3 social workers, a child psychiatrist, and a school for reeducation, as an annex. The clinic is beginning a course on mental hygiene for teachers, social workers, and educators.

PANAMERICAN MEDICAL CONFEDERATION.—Dr. José Angel Bustamante, a founder and secretary of the Cuban Society of Neurology and Psychiatry and editor of the Cuban Review of Neurology and Psy-

chiatry, reports that at the first Panamerican Medical-Social Congress, held in the City of Havana during December 1946, fifteen Latin-American countries collaborated in the establishment of the Panamerican Medical Confederation.

President Harrison Shoulders and ex-President Gordon Heyd of the American Medical Association and Dr. Austin Smith, secretary of the Council on Pharmacy and Chemistry attended the Havana Meeting, and the question of uniting with the Panamerican Medical Confederation will be dealt with at the June meeting of the A.M.A.

The second Panamerican Medical-Social Congress will be held in Lima, Peru in December 1948. The Congress will represent all branches of medicine and there will be a section on psychiatry and neurology. North American physicians working in these fields are invited to contribute to the program of this section. Correspondence should be addressed to Dr. J. A. Bustamente, Malecon 61, Apartado 2589, La Habana, Cuba.

Countries participating in the founding of the Panamerican Medical Confederation were: Mexico, Guatemala, Salvador, Honduras, Costa Rica, Panama, Columbia, Venezuela, Uruguay, Argentina, Chile, Peru, Ecuador, Puerto Rico, Cuba.

AMERICAN JOURNAL OF OCCUPATIONAL THERAPY.—February, 1947, marked the initial number of the American Journal of Occupational Therapy, official publication of the American Occupational Therapy Association. Charlotte D. Bone is editor; she is assisted by 30 division editors who are concerned with the various aspects of the field of occupational therapy. There is also an advisory committee, on which Dr. William Rush Dunton is editorial adviser. The Journal is published bimonthly, and the subscription price is $5.00 a year. Inquiries may be addressed to the American Occupational Therapy Association, 33 West 42d St., New York City.

Dr. Dunton has recently retired as editor of Occupational Therapy and Rehabilitation, which he founded 25 years ago. The publishers of this journal will continue its publication, with a slant that will appeal to physicians rather than to therapists, so that there may be no conflict of interests. The editor is Dr. Sidney Licht, 30 Hillside Ave., Cambridge, Mass.

RESIDENCIES, PRATT DIAGNOSTIC HOSPITAL.—The Joseph H. Pratt Diagnostic Hospital, a unit of the New England Medical Center, announces psychiatric residencies one year in duration. Psychiatric patients number about 1,500 house cases and 500 out-patient cases annually. They consist largely of those with neuroses or emotional or personal complications of disease. There will also be a limited number of patients with psychosis. Residents' work will consist in diagnosis, workup, handling, and treatment of patients. Applications should be addressed to Mr. Richard T. Viguers, Administrator, 30 Bennet St., Boston 11, Mass.

BLIND VETERANS UNDER VETERANS ADMINISTRATION.—A survey made by VA's vocational rehabilitation and education staff revealed that nearly half the blinded veterans discharged by the Army and Navy up to the end of November, 1946, were either working or in training. Of the 1,133 veterans who lost their sight in World War II, 231 were in educational institutions. Farming, law, and social work are the most popular courses. Blinded veterans eligible for education and training under the Vocational Rehabilitation Act receive free tuition and fees and a subsistence allowance from VA, in addition to their disability compensation payments.

CHILDREN'S BUREAU CONFERENCE ON CEREBRAL PALSY.—The Children's Bureau on March 26-28 brought together in conference the medical specialists in the field of cerebral palsy and professional personnel from the related fields involved in the care, education, and training of spastic children. The conference was preparatory to a general expansion of services by the Bureau to this special group, made possible by the increased Federal funds for work with crippled children. The Bureau estimates there are 175,000 spastic children in the country, for whom little help has been available from either public or private sources.

The importance of providing continuity in the child's treatment, education, and training over the years was stressed throughout the conference. Major recommendations look toward a long-range program under Federal-State auspices. The service to be established would be a part of existing state crippled children's programs but would have as its nucleus a diagnostic unit set up in a medical center. Here the child could be studied by medical specialists and also by psychologists, physical therapists, medical social workers, and teachers. Crippled children's clinics throughout each state would also be established. Special emphasis was given at the conference to the need for research and for education of parents, doctors, and the general public in regard to the problems of the spastic child.

SUGGESTED 3-YEAR FULL-TIME TRAINING PROGRAM FOR PSYCHIATRISTS

The AMERICAN BOARD OF PSYCHIATRY AND NEUROLOGY, INC., submits the following suggestions for a training program.

1. One year of in-patient work with an adequate variety of psychiatric conditions.

2. Six months full-time out-patient clinic work, or its equivalent, with emphasis on the study and treatment of psychoneurotic patients, with a minimum of 20 interviews per week per resident.

3. Six months neurology—½ time clinical; ½ time basic.

4. Six months half-time service in the psychiatric aspects of general medical and surgical conditions.

5. Six months half-time child psychiatry and experience in working with psychologists and psychiatric social workers.

6. Six months in specialized institutional psychiatry (feeble-minded, epileptic, forensic psychiatry, penology, drug and alcohol addiction, and so forth).

7. During these 3 years it is recommended that there be available teaching ward rounds, staff conferences, seminars, journal clubs, adequate psychiatric texts and periodicals, participation in some phase of psychiatric investigation.

8. During these 3 years there should be adequate instruction in the basic psychiatric concepts as covered in the material recommended in the syllabus of the American Board of Psychiatry and Neurology.

9. In institutions in which there is no full-time senior staff there should be in the aggregate a minimum of 15 hours a week service by senior attending staff in capacities instructive to the resident staff.

10. In planning or evaluating training, one, two, or three year programs may be worked out to include various fractions of the foregoing suggested items. For instance, a resident may devote a full day or half day a week to the psychiatric aspects of medical and surgical conditions for a year or so while assuming major clinical responsibilities in a psychiatric hospital.

The only purpose in suggesting the foregoing program is to indicate a desirable spread of experience in the training of a psychiatrist. It is thought unwise for any teaching program to be rigidly or slavishly followed.

BOOK REVIEWS

AGNOSIA, APRAXIA, APHASIA, THEIR VALUE IN CEREBRAL LOCALIZATION. (Second edition, revised and enlarged, 1946.) By *J. M. Nielsen.* (New York: Paul B. Hoeber, Inc. 1946.)

As the title of this book indicates, it is a study of aphasia and related conditions, made with particular attention to functional localization in the cerebral cortex. The author, who is Associate Professor of Medicine (Neurology) at the University of Southern California, is an eminent neurologist who has devoted many years to the study of aphasia from the clinical and pathological standpoints. The first edition, published privately by the author in 1936, had a relatively small circulation, and this enlarged second edition will therefore be, for most medical readers, an entirely new book.

Aphasia presents one of the most difficult problems in the field of neurology. It is territory on which neurology, psychiatry, and psychology meet, where boundaries are sometimes impossible to define and terminologies become dangerously confused with one another. The present author has kept this clearly in mind and has given a clear-cut and objective account of this difficult subject. His approach is that of a clinician with an interest in the "philosophy of cerebral function," and he tries, as far as his facts will justify it, to analyse the varied disturbances of speech function in terms of localized cortical lesions.

The book begins with an historical introduction and a detailed definition of terms, including a discussion of the various disturbances of the body scheme. There follows in the main part of the book his evidence for cerebral localization of speech, an analysis of selected cases, with the location of the pathological lesions found in each. A number of the cited cases have been taken from Henschen's monumental work, but many interesting and important cases studied by the author have been described in detail. The majority of the lesions were vascular in type, though some were examples of surgical removal of tissue. There is a useful section on methods of examination and a good bibliography of the subject of aphasia. The appendix contains an excellent summary of the main argument of the book with a section on the complicated terminology of aphasia, agnosia, and apraxia.

This is an important book, which will stimulate new interest in clinical study of aphasia and cerebral localization, at a time when interest has lagged, and the trend of thought has been away from strict localization of the function of speech, with emphasis on psychological analyses of aphasia. The author makes a strong case for the localization of speech functions in a number of interrelated centers in the major hemisphere, and he distinguishes various types of aphasia, based on the localization of the lesion. In this he is reemphasizing the rather "schematic" views of some older students of aphasia. He stresses the important role of the minor hemisphere in the recovery of speech after destruction of centers in the major hemisphere; this will be a new idea for many readers. He introduces the new concept of a "language formulation area" or near Brodmann's Area 37 in the major temporal lobe, though his argument here is sometimes hard to follow. He draws attention to an important anatomical area in the brain, "the temporal isthmus," a narrow band of white matter connecting temporal lobe to the rest of the cerebral hemisphere. This is a veritable "crossroads" through which pass the visual, auditory, and other thalamo-cortical radiations, and many commissural and association bundles. Lesions in this area of the major hemisphere will result in marked aphasia, in addition to other neurological changes.

Some of his conclusions are, of necessity, tentative and must await confirmation from future studies following surgical removal of well-defined cortical areas; but his analysis does lay careful ground work upon which such studies must be based.

The reviewer feels that the book would be more readable if the material were better arranged, with less repetition, and with more concise presentation of clinical-pathological studies. One would also like to see some discussion of the practical problems of speech therapy in aphasia.

The book is of monograph size, well printed and bound, and the illustrations are satisfactory throughout. It is highly recommended to neurologists, psychiatrists, and all others interested in the "philosophy of cerebral function."

F. L. MCNAUGHTON, M. D.,
Montreal.

SCIENCE FOR DEMOCRACY. Edited, with an introduction, by *Jerome Nathanson.* (New York: Kings Crown Press, 1946.)

This book is the result of a third series of conferences on "the scientific spirit and democratic faith" and presumably represents an improvement over its predecessors. It is divided into four sections: (1) Science in the national economy, with papers by Paul B. Sears, Jerome Frank, and Robert S. Lynd concerned with the importance of conservation and the dangers of reading Hayek. (2) The challenge of science to social thinking, with papers on "Freedom and Abundance" by K. F. Martin, in which the all-time high for the claims of science seems to be reached in a statement that "there is enough and to spare of all the necessary raw materials to provide the physical basis for the efficient, comfortable existence of every human being who is likely to be born anywhere on the earth during the next 2000 years at least" (p. 29), and "Psychiatry Comes of Age" by J. A. P. Miller, a moderate and interesting discussion. (3) Symposium: "Does Private Industry Threaten Freedom of Scientific Research," with much on patents and an important statement that "colleges and universities should be told . . . that they should not engage in research for a private concern" (p. 108), and "The Role of Science in Determination of Democratic

Policy," with an interesting statement that "often it is the social scientist's presence and prestige, rather than his knowledge, that are wanted" (p. 121).

The symposiums illustrate most clearly the strong and weak points of this type of publication. An occasional illuminating comment is made, and much is said that should never have been printed. The volume would have gained immensely by reduction to pamphlet size. In spite of careful editing, an impression of confusion appears inevitable, The diversity of personnel with over 30 participants and the contrast between those with a capacity for saying little in many words and those saying much in few words and those saying nothing imply difficulties which even the most competent chairmen cannot overcome. The whole gives an impression of pretentiousness and lack of penetration, but the book trade is apparently an insuperable obstacle to the publication of pamphlets, and prestige demands that words spoken should be permanently recorded.

H. A. Innis, Ph. D., F.R.S.C.
University of Toronto.

Hypnoanalysis. By *Lewis R. Wolberg.* (New York: Grune and Stratton, Inc., 1945.)

This book unquestionably constitutes a highly significant contribution to the literature. It is a simple straight-forward comprehensive account of the successful psychotherapy of a schizophrenic patient of the hebephrenic type by the use of hypnotic and psychoanalytic techniques, singly and in combination. Furthermore, its author is a psychoanalyst of good repute, well-respected by his colleagues, modest and conservative in his claims, and the book contains additionally, an excellent psychoanalytically oriented interpretation of the patient's clinical history by Kardiner.

Hence any review, as can readily be appreciated from the reviews that have already appeared, is necessarily a difficult task because of the numerous heresies the author commits, and which, fortunately, serve for the advancement of psychiatry, psychoanalysis, and hypnosis.

Mention should be made of a few of these heresies. In the first place, even though the author is a psychoanalyst, he disregarded Freud's harsh judgment against hypnosis which has been so blindly and tenaciously adhered to despite the constant growth of evidence to the contrary. It is bad enough for an opponent to expose a truly great man's error, but it is practically unforgivable when a follower does so. It necessitates a reassessment of psychoanalytic teachings and judgments on hypnosis all along the line with the reversal of many an attitude and opinion, and a recognition that mere entrenchment of beliefs does not make them valid.

Secondly, the author, as has been pointed out by another reviewer, has had the poor judgment to present a case of the successful psychotherapy of a hebephrenic schizophrenic when everybody knows that hebephrenia is really not accessible to psychotherapy, especially one showing obvious personality deterioration as did Wolberg's patient. Whatever the protests and condemnations this heresy evokes, it is time that established belief and opinion were routed from the chair of judgment and replaced by facts of accomplishment. Naturally it is painful and difficult to accept revision of cherished beliefs, but in any science as young as psychotherapy, established traditional beliefs have no place. Facts and accomplishments only are important.

Then, too, psychoanalysis has long been recognized as the "most effective and adequate form of psychotherapy." Hence, there was no excuse for the author to utilize both hypnotic and psychoanalytic techniques, except, of course, the excuse of scientifically oriented research which culminated in a successful therapeutic accomplishment. This, too, will necessitate a revision of opinionated ideas and force a revision and an improvement of current concepts of psychotherapy, rather than a continuance of traditions. This statement is not intended to minimize the tremendous significance of Freud's contributions to psychotherapy; rather, it is intended only to emphasize Freud's own statement made in 1919, namely, that the development of psychoanalytic therapy would proceed in a fashion different from the established classical or orthodox procedure. Wolberg's book is an outstanding example of such development.

There are other comments to be made about Wolberg's book, some of which have been emphasized by other reviewers. One of these is that it is deficient in that it does not elaborate extensively regarding either hypnosis or psychoanalysis. This reviewer agrees with that criticism, but regards it as irrelevant since Wolberg's purpose was to present an adequate account of his research in the hypnoanalysis of a psychotic patient, and he cannot be held responsible for more than that.

The book properly is not intended as an encyclopedia on hebephrenic schizophrenia, psychoanalysis, hypnosis, or psychotherapy. It is only a revealing, informative, instructive and adequate account of the successful use of hypnosis and psychoanalysis in the therapy of a single patient, conservatively and modestly reported, and in a fashion that will enable others to apply intelligently similar measures and procedures. More ought not to be asked of one book.

Other criticisms concern the limitations of hypnotherapy, the impossibility of applying deep hypnosis to a sufficiently large number of patients, the importance for hypnoanalytic therapy of somnambulism, the difficulties in combining psychoanalytic and hypnotic techniques and a variety of other objections, which, in the experience of this reviewer, are arm-chair judgments that ought not to be regarded as valid criticisms, but rather looked upon as signifying problems requiring research rather than pronouncements.

As for the actual contents of the book, one needs to read the book in full to gain an appreciation of how much valid work in hypnosis has been accomplished in the last fifteen years and how well the author combined those techniques with psychoanalytic techniques and actually applied them effectively to a most difficult problem in psychotherapy.

The book is well written, easy to read, and commands full interest, and is deserving of the highest praise.

Milton H. Erickson, M. D.,
Wayne County Hospital and Infirm.,
Eloise, Michigan.

MODERN PSYCHIATRY. By *William S. Sadler, M. D.* (St. Louis: C. V. Mosby Co. 1945.)

This text on Modern Psychiatry is unusual in both its arrangement and content. In it, the author has presented a well-organized concept of psychiatry and of psychological processes as they appear to him in the light of recent developments in the field.

The book is the result of much practical experience with psychiatric patients correlated with considerable reading and much reflection on the part of the author. It is unfortunate that much of the material quoted is insufficiently substantiated either in the text or by an adequate bibliography and that repetition and a certain looseness of thought or of verbal structure make some of the conclusions difficult to understand.

The book is however well arranged. Part I,—231 pages in which the author discusses personality problems,—is largely the personal reflections of the author as a result of many years of experience. That his experience is wide enough in some fields is doubtful. In his treatment of the psychiatric problems of childhood he disagrees with Freud as to the importance of early sex trauma stating merely that "my long study of these cases does not confirm this claim—." A precept,—"Teach the child that crying will get him nothing" is surely one to which not many except the author will today adhere without further explanation.

In parts II and III, the psychoneuroses and psychoses are defined and discussed. This is the best part of the book. In it the conventional definitions and concepts of these disorders are set down in good order and at some length, together with some documentation concerning the ideas of previous authors on the points discussed. There is little mention of the most recent material however. Here, as in the first section, the observations resulting from personal experience are interesting. But the constant use of the personal pronoun in a text of this size is annoying and detracts from the weight of the opinions stated. The verbosity and use of informal language are distracting for the same reasons.

The last section, on psychotherapeutics, is the poorest. The sub-headings,—suggestion and hypnotism; psychiatry and the psychiatrist; sublimation and fears; habit and self control; philosophy and religion,—will indicate its scope. It gives no feeling that there is more than a slight and superficial understanding of any of the principles of psychobiology and psychodynamics upon which modern psychotherapeutic progress is founded.

The final chapters,—Schools of Psychiatry (a historical review), Bibliography (of three pages, for a text of 900 pages) and Glossary are totally inadequate. The glossary underestimates the intellectual calibre of a reader of even high-school age and culture.

Throughout the book the author presents his concept of personality and its disorders from a limited point of view. In discussing personality structure his use of the adjectives good and bad, selfish and unselfish or cynical and liberal-minded are legitimate for such a personal presentation; they are not, however, usual in a text book of this size. They are, in addition, inconsistent with present-day concepts of the dynamics of personality, but there is no recognition of this fact.

In the opinion of this reviewer, were the book limited to perhaps 200 pages and were it entitled *"Personal Experiences in Modern Psychiatry"* or *"Reflections on the Present Ideas of Modern Psychiatry"* it would be a book of great interest to a limited audience. To this audience it would represent in condensed and more readable form, what it actually is,—a statement of personal beliefs and philosophical conclusions and, as such, a psychobiological study of an individual with many years of wide experience in the field of practical psychiatry.

MARGARET A. KENNARD, M. D.,
Bellevue Hospital, New York.

PSYCHOLOGY FOR NURSES. By *Bess V. Cunningham, Ph. D.* (New York, London: D. Appleton-Century Co., Inc., 1946.)

This is a textbook on psychology written from the broad viewpoint of general human behavior but at the same time circumscribed within specific areas of nursing. The author has approached the study of man as a whole based upon the biological sciences but woven upon this general tapestry the particular patterns which will be of concern to the nurse. For instance, the reactions of the young child as a patient are discussed, and from this the nurse learns something of the parent-child relationships, theories of heredity, importance of environment, etc.

Not only will the student nurse find this text valuable in relation to her patients, but it should be an excellent means of developing understanding of herself and thus assist her in making adjustments and progress through the school of nursing. The section on study including note taking and other techniques should be especially valuable to the student who is beginning her course.

This textbook has been well illustrated. The terminology is simple and the subject matter clearly and concisely delineated. The explanations are adequate but not long involved discussions. At the end of each chapter there is a summary together with a group of suggested activities and a list of reference readings, all of which should be most valuable to the student.

It is the opinion of the reviewer that the study of this book should be a part of the curriculum of every student nurse.

LAURA W. FITZSIMMONS, R. N., M. A.,
Washington, D. C.

THE CARE OF THE AGED (GERIATRICS). By *Malford W. Thewlis, M.D.* 5th Edition, Thoroughly Revised with 65 Illustrations. (St. Louis: The C. V. Mosby Company, 1946.)

This book is divided into 8 parts which are concerned with general considerations, geritology; medical-legal relations; miscellaneous geriatric problems; disease of metabolism and endocrine dis-

orders; infectious disease and focal infection; systemic pathology, and special topics.

From the psychiatrist's point of view, the air of optimism which pervades this book on geriatrics is one of its greatest contributions. There is always a feeling that not only must something be done for the aged but that a good deal can be done. The author is specific in his recommendations regarding therapy; he doesn't simply advise hobbies and activities but specifically devotes a whole chapter to the subject, discussing the pros and cons of various specific hobbies, sports, games, etc. There is a special chapter on what the author calls logotherapy, pointing out that much can be done for or against the patient by the proper or improper use of words, and he gives numerous pertinent examples and suggestions.

This book does not deal primarily in psychiatry. It has a good psychosomatic orientation, and the anatomy, physiology, and pathology of the systems in health and disease are thoroughly studied as they apply to the aged. A sharp distinction is made between senescence and senility, the former being the normal for the aged and the latter, pathological. Comprehension of this distinction will lead the practitioner to a more scientific evaluation of symptomatology. It behooves the practitioner to be as familiar with the aspects of geriatrics as he usually is with pediatrics. This book should serve as a good standard text on geriatrics.

MORRIS GRAYSON, M. D.,
Bellevue Hospital, New York.

PROBLEMS IN PREJUDICE. By *Eugene Hartley*, with a Foreword by Gardiner Murphy. (New York: King's Crown Press, 1946.)

This volume has been produced by the offset method. It contains a report of three studies in which the author has attempted to make an objective quantitative examination of prejudice. The subjects were college students, and the questionnaire method was employed.

The major study is on the "generality" of the prejudice reaction. The results indicate that there is a pattern of prejudice ("a general American tradition of preference for members of certain ethnic groups") which is constant throughout the various student groups studied. This generalized pattern is not related to the actual contact an individual may have had with the members of the ethnic groups considered. The hierarchy of preference is to be found among practically all sections of the population. Even among members of minority groups the evidence of a constant general pattern is clear. The subject's "own group" is simply placed at the top of the list, and the rest of the pattern tends to remain intact. The generalized nature of the prejudice attitude was further demonstrated experimentally by introducing nonexistent ethnic groups with fictitious names. A high correlation was shown between prejudice toward real groups and prejudice toward fictitious groups.

Of the two minor studies included in the monograph, one deals with biographical material from which the author attempts a descriptive differentiation between the "relatively tolerant" and the "relatively intolerant" types of personality. The second of the minor studies makes an effort to explore objectively William Stern's concept of "salience" in personality structure.

C. R. MYERS, PH. D.,
Univ. of Toronto.

NON-PROJECTIVE PERSONALITY TESTS. By *Harold A. Abramson and others.* (Annals of the New York Academy of Sciences, **46**: 531, Article 7, 1946.)

This volume contains the papers presented, and the discussion which followed their presentation, at a conference held by the Section of Psychology of the New York Academy of Sciences on March 30 and 31, 1945.

Papers by Harold A. Abramson on the Minnesota Multiphasic and by George Killinger and Joseph Zubin on the Personal Inventory (NDRC) were discussed by Rose G. Anderson and Arthur E. Traxler.

A series of papers on the Cornell Selectee Index by Bela Mittelmann and Keeve Brodman, Arthur Weider and David Wechsler, Harold G. Wolff and Harold J. Harris, were discussed by William A. Hunt, Morton A. Seidenfeld, and N. W. Morton.

Papers on the use of ability test patterns for personality study by Roy Schafer, Edith Wladkowsky, and Zygmunt A. Piotrowski were discussed by F. L. Wells.

Papers on the theoretical principles underlying nonprojective tests by David Rapaport and Martin Scheerer were discussed by Joel Shor and Morris Krugman.

This collection of papers constitutes a useful supplement to the current literature on the use of psychological test aids in personality study.

C. R. MYERS, PH. D.,
Univ. of Toronto.

THE JEHOVAH'S WITNESSES. By *Herbert Hewitt Stroup.* (New York: Columbia University Press, 1945.)

This book, a study essay of the religious movement of the same name, presents about as much data as are obtainable by a nonmember or even a member not of the hierarchy of the movement. It presents an impressionistic picture of the average person who has accepted the presuppositions of the movement. Inasmuch as this interpretation of Christianity is comparatively new in the history of religion and a change in leadership introduces some modification in emphasis, and further since certain aspects of the whole are shrouded in secrecy, it is impossible for any author to speak with finality upon some important considerations.

The book is preeminently a sociological study through which the reader can clearly see the type of person who has been attracted to the movement, the individual who has been hurt by society as it is currently functioning, the disinherited who have been baffled by a system, the utter complexity of which makes it forever beyond their control. In harmony

with all apocalyptic movements, Jehovah's Witnesses anticipate the nearness of the Kingdom for which they long and their release from the intolerable aspects of life by the severity of the hardships which they must endure. This naive hope, supported by alleged historical facts, is such as to give vitality to those of the humble economic, social, and intellectual background from which adherents have been successfully recruited.

The rather dull but highly efficient mechanics of the movement have been carefully delineated by the author. He has left no doubt that this is a "religion of a book" but only as interpreted by the spokesman for the group. Loyalty to "the truth" has been measured for the most part by the tireless effort of Jehovah's Witnesses to sell the books written by the late president, Joseph F. Rutherford. There is no attempt to write a critique of their exegesis and no endeavor to examine their appropriation of history. The adjustments demanded by unfulfilled prophecies and exploded expectations have not been recorded. The author does not argue with them—he describes them.

The reader whose primary concern is with the nature of religion might well desire a clearer statement of psychological motivations and more definite evaluations of results in the practical issues of life. By inference the author has maintained that the movement is neither an unmitigated evil nor an unmixed good. A religious movement merits judgment on the basis of religious criteria. It is intellectually respectable? Does it satisfy a perpetual longing in man? Has it the power to create moral values for the individual? Is it of significant worth to society? The casual references to clashes of this movement with organized society, because of objectionistic attitudes toward vaccination, the use of aluminum cooking utensils, and patriotism such as flag saluting or their attitude toward war, do not provide an adequate basis for a value judgment of the movement. As a sociological commentary upon one phase of current religious life, the book, while dull reading, deserves the respect of thoughtful readers for what it purports to be.

GEORGE A. ELLIOTT, M. D.,
Brattleboro. Vt.

PEOPLE IN QUANDARIES. By *Wendell Johnson, Ph.D.* (New York and London: Harper & Brothers, 1946.)

This book in the narrower sense is addressed to the "maladjusted," but in its broader aspects to all those who view with dismay the destructive ends to which mankind persistently applies that scientific genius that offers such great promise for the good life. As the author observes, these abuses of scientific techniques can be traced to our failure to apply scientific methods of inquiry to those areas of our cultural experience where we have applied its products. The solution of the problem then, so stated, logically appears to be one of applying scientific methods of inquiry to matters of personal and social adjustment, which when carried to logical conclusion implies a foundation for resolving conflict on community, national, and international levels. This Dr. Johnson proceeds to show us how to do, from the approach of general semantics, since in his opinion "the language of science is the better part of the method of science."

Contrasting the "language of science" with the "language of maladjustment" Dr. Johnson notes fundamental differences that reflect deeper differences in orientation. These differences he reduces to the principles of general semantics, showing how their violation leads to interpretations and evaluations of the nonverbal level of "reality" in terms of a static concept of reality instead of the dynamic, ever-changing process-like reality inferred by modern science; isolated entities instead of events; elementalistic schisms instead of space-time relationships; types and classes instead of subtly graded differences, and a high degree of unconscious self-projection. According to the author, this prescientific orientation toward ourselves and the world we live in inheres in and is fostered by the structure of our language, which, evolved in prescientific eras by primitive men with limited means of observation and inquiry, symbolizes a nonverbal level of reality vastly different in concept from that envisioned by modern science. Many of the confusions of mankind then, with their devastating consequences on our economic, social, and political life, not to mention personal adjustment, Dr. Johnson would attribute to two factors: misevaluations inherent in a language structurally inconsistent with the realities it seeks to symbolize, and failure to comprehend the inferential nature of our observations and the symbolic nature of language.

In the first half of the book an awareness of language as a form of symbolic behavior is developed in an explanation of the processes of abstracting involved not only in use of language but in making observations and evaluations. A series of practical techniques and working devices are presented to cultivate greater awareness of these abstracting processes. In the latter half of the book the author shows how the principles of general semantics operate by showing how they are violated in conditions of maladjustment. Schizophrenia is seen from this point of view as an extreme form of confusing and identifying the levels of abstracting; paranoia illustrates the extreme of unconscious self-projection; and the inferiority complex is viewed as a more or less universal symptom in a culture which fosters two-valued instead of infinite-valued orientations.

Drawing from his experience as a clinical psychologist the author shows how the principles of general semantics applied in this area would stress descriptive diagnoses in terms of behavior and the specific conditions that stimulate or limit it, on "causes" of maladjustive behavior only to the extent they can be directly related to specific maladjustment. In therapy, emphasis is placed on alterations in the general orientation of the individual in relation to his semantic environment as a prerequisite to altering the specific maladjustive symptom. A chapter on stuttering illustrates the practical application of these principles to treatment of a specific symptom regarded as one of evaluative maladjustment in a semantic environment which places high evaluation on speech fluency. All

through the book challenging implications for change from the general semantics approach are indicated in the fields of education, child guidance, clinical psychology, communications.

In applying himself to developing a greater awareness of language as a form of behavior that can ensnare and limit the thinking processes as well as implement them, in revealing the role of language behavior in developing false evaluations and assumptions, Dr. Johnson performs a service of considerable value to the reader sensitive to the needs and possibilities of self-adjustment who is continuously bombarded on all sides by an overwhelming flood of words exhorting him to feel, think, and act in a myriad of ways. But from the theoretical point of view it is necessary to point out certain conclusions, stated or implied by the author, that are to say the least open to question.

Dr. Johnson has described with great vividness the "schizophrenic" pattern of our culture in which the products of scientific techniques introduce chaotic discord into those institutions and traditions where scientific principles have not yet been fully applied. But his conclusion that the structure of our language is largely responsible for the freezing of prescientific orientations preserved in these institutions is perhaps an oversimplification. A relevant inquiry in this regard would be to ask if it is purely accidental or incidental that we have been able to free ourselves from the limitations imposed by our language structure in certain areas while we remain victims of language and the orientations it fosters in other areas. Dr. Johnson would apparently answer this in the affirmative. In speculating on the reasons why extensional (scientific) principles of living have not been taught to children along with their ABC's he concludes that it is simply because their parents and teachers have not known these principles. One might ask if a cart has not been placed before the horse in such statements as this: "The major advances in psychology that have been achieved during the past 30 years or so have been due largely to the increasing use of a language more highly descriptive of behavior." In stressing language as behavior the author points up a vital aspect of behavior functioning in maladjustment, but that it is the major determinant of orientation, as is so strongly implied in this and other statements, is what the author himself would probably regard as a one-valued approach to a question involving many factors.

It is regrettable that, in his discussion on the treatment of stuttering from a general semantics approach, the only specific case referred to is, as the author admits, an atypical one. In this case of an Indian youth who became mute after a brief period of stuttering on the belief that God had sealed his lips, the solution applied—which the author calls "ingenious"—was to convince him that God would be pleased if he would continue to speak and spread the gospel in spite of stuttering. In view of the author's dynamic approach to clinical psychology we trust that "treatment" in this case was also atypical.

C. C. Burlingame, M. D.,
Institute of Living, Hartford, Conn.

Thirty-Second Annual Report of the Municipal Court of Philadelphia for 1945.

This is a volume of 405 pages with many statistical tables outlining the operations of the Municipal Court of Philadelphia in its 7 divisions: adoptions, civil, small claims and conciliation, criminal, domestic relations, juvenile, and misdemeanants. An appendix contains most interesting articles by John O. Reinemann on "Where Do Philadelphia's Delinquent Children Live," by E. P. Corson-White on "Blood Grouping Tests as a Method for the Determination of Nonparentage," and by Karl Birnbaum on "The Question of the Defective Delinquent."

To be noted is the statement by President Judge Charles L. Brown that "this Court encompasses in its duties a greater variety of judicial problems than any other court in the world and has been so successful and so exemplary that it has become a model system emulated by many similar institutions throughout the world." Judge Brown claims that "delinquency may be said to be a mere reflection of the turbulence and violence of a chaotic state and is a form of protest consisting of two component parts: the individual nature of the delinquent and the exterior condition, i. e., physical, social and economic." "Children are very impressionable and readily influenced when subjected to the stimulation of the cinema, reading publications, and listening to disturbing radio crimes committed by adults who by their wits, hope to evade the law, even though guilty of the perpetration of crimes of a vicious character."

Juvenile delinquency has increased 56% in Philadelphia since 1940. However, it affects only about 2% of children of juvenile court age. "The great emphasis placed by the court on investigation and preliminary work is indicative of the tribunal's basic attitude toward juvenile delinquency. Not the offense so much as the personality of the offender is the most important consideration." Thirty-three percent of the boys were referred to the court for stealing, while 67% of the girls were referred for sex offenses. Only 18% of the population, 7 to 17 years of age in Philadelphia, were Negroes, but they furnished 45% of the individual delinquent children. Forty-one percent of the delinquent native white children of foreign or mixed parentage were Italians. Only 48% of 3,762 cases examined were of normal intelligence. Indicative of the enlightened viewpoint of this court is the fact that no less than 8 psychiatrists and 3 psychologists are attached to it. The number of psychiatric examinations during 1945 was 7,675; of these 53% revealed no neuropsychiatric abnormalities. The mental defectives comprised the largest group, 36%; the psychoneurotics, 2.3%; psychotics, 1.4%; psychopathic personalities, 1.1%; and alcoholics, 0.5%.

This report will well repay the attention of the sociologist, criminologist, and psychiatrist as well as the socially minded citizen.

C. M. Crawford, M. D.,
Kingston (Ontario) Penitentiary

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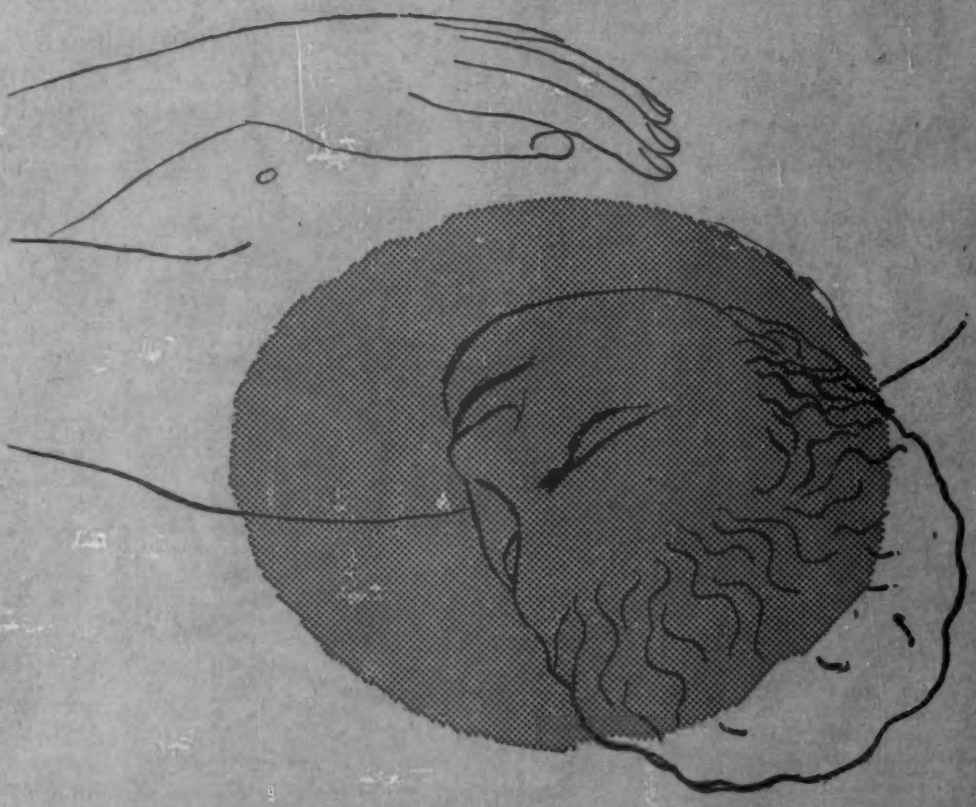

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